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The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

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OUTSTANDING POTATO LATE BLIGHT CONTROL IN FLORIDA WITH A NEW ORGANIC FUNGICIDE COMBINED WITH ZINC SULFATE

Geo. D. Ruehle

A water-soluble derivative of dithiocarbamic acid, known chemically as disodium ethylene bisdithiocarbamate, and recently developed by the Rohm and Haas Company under the code number of He 175[1], when combined with zinc sulfate or zinc sulfate and lime, gave outstanding control of potato late blight in experimental test plots in Southern Florida during the 1943-44 season.

The new fungicide had been tested, without the addition of zinc sulfate, as a protective fungicide on several crops in Southern Florida during the 1942-43 season. In test plots of potatoes sprayed by Dr. J. W. Heuberger for the Rohm and Haas Company, and observed throughout the course of the experiments by the writer, control of Phytophthora infestans (Mont.) DeBy. was not exceptional but indicated that the compound might prove a good substitute for copper fungicides should these become unavailable. During the spring of 1943, experiments at the Sub-Tropical Experiment Station with tomatoes showed that He 175 possessed considerable fungicidal efficacy for control of Alternaria solani (Ell. & Mart.) Jones & Grout and Stemphylium solani Weber, but was not superior to some of the well known copper sprays. When used during the summer rainy season on avocados for control of Cercospora spot, He 175 proved less effective than wettable Cuprocide and showed a pronounced tendency to burn the fruit. Run-off from the foliage was excessive in all cases.

The combination of zinc sulfate and hydrated lime with insoluble copper fungicides has been used by the writer for several years in nutritional spray tests.[2] The addition of zinc sulfate-lime to copper sprays causes a flocculation of the suspended copper particles, decreases run-off and increases the initial deposit of copper on various types of foliage. The use of the combination has consistently resulted in obtaining increases in yields of tomatoes which in some years were significant. On potatoes the results have been more erratic than on other crops, but reduction in the tendency of copper fungicides to cause foliage injury has been observed in some seasons.

It was observed jointly with Doctor Heuberger that the addition of zinc sulfate and lime to He 175 caused flocculation and, therefore, it was believed that the combination might prove more effective as a fungicide than the He 175 used alone. Such proved to be the case in tests conducted by Heuberger and Manns[3] in Delaware during the summer of 1943 for control

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1 Dimond, A. E., J. W. Heuberger and J. G. Horsfall. A water-soluble protectant fungicide with tenacity. Phytopathology 33: 1095-1097, 1943.

2 Ruehle, G. D. The use of zinc salts with copper fungicides on tomatoes in Dade County. Proc. Fla. State Hort. Soc. for 1942: 133-134.

3 Heuberger, J. W. and T. F. Manns. The use of zinc sulfate-lime as a supplementary material to improve the protective value of organic and insoluble-copper fungicides against early blight of potatoes. Delaware Agr. Exp. Sta. Phamphlet No. 10, January 1944.

of Alternaria solani on potatoes, and in the tests herein described for control of potato late blight in Dade County, Florida, during the winter of 1943-44.

Two field experiments were conducted at the Sub-Tropical Experiment Station on a medium strain of Bliss Triumph potatoes grown in calcareous marl soil during the winter months. In each test, the potatoes were planted and fertilized uniformly on November 23, 1943, with a tractor-drawn potato planter, and were harvested early in March when the foliage was dead. Late blight was present in a mild form in all the test plots at the time of the first spray application and the weather was favorable for development and spread of the fungus throughout most of the growing season.

In the first test, conducted by Dr. L. L. Hill of the Rohm and Haas Company, the sprays were applied with a knapsack sprayer at 3- to 8-day intervals for a total of 9 applications. The treatments were replicated 3 times each in single-row plots 22 feet long. The materials used, yield in bushels per acre and the percentage of tubers grading U. S. No. 1 are shown in Table 1. In addition to the treatments shown in Table 1, the He 175 was tried in dust form and as a wet spray in combination with manganese sulfate, aluminum sulfate and with hydrated lime. All of these treatments proved inferior to the He 175 used alone as a wet spray.

Table 1. Results of spray test on potatoes with He 175 used alone and in combination with zinc sulfate or zinc sulfate-lime Homestead, Florida, 1943-44.

Materials	Formulas (lbs. - gallons H_2O)	Bushels per acre	Percentage of yield in U.S. No.1 tubers
Untreated - check		93.8	54.3
He 175	2-100	163.7	76.7
He 175	4-100	186.5	78.9
He 175 + $ZnSO_4$	2-1-100	353.4	92.7
He 175 + $ZnSO_4$	4-1-100	311.4	87.5
He 175 + $ZnSO_4$-lime	2-1-1/2-100	325.4	90.8
He 175 + $ZnSO_4$-lime	4-1-1/2-100	381.4	93.4

The data show that the addition of zinc sulfate greatly increases the effectiveness of He 175 for control of potato late blight. The increases in yields obtained from the combination are highly significant and cannot be explained as zinc stimulation or as reduction of run-off. The sulfates of manganese and aluminum also cause flocculation and reduce run-off but these compounds failed to increase disease control or yields when used with the He 175. Some foliage injury appeared late in the season in the plots sprayed with He 175 plus zinc sulfate without the addition of lime. This was attributed to zinc toxicity, so that it would appear desirable to add lime as a safety precaution.

In the second test, the fungicides were applied with a tractor-drawn power sprayer at 400 lbs. pressure. The plots were approximately 1/46 acre in size and each treatment was replicated 3 times. A total of 7 applications were made at 6- or 7-day intervals during the season and blight was present in all plots when the first sprays were applied. The fungicides used were: He 175 - $ZnSO_4$ - hydrated lime, 1 1/2-2-1-100; copper-hydro, 8-100; copper-hydro - $ZnSO_4$ - lime, 8-2-1-100; wettable Cuprocide - $ZnSO_4$ - lime, 1 1/2-1-1/2-100; wettable Cuprocide - $CuSO_4$ - lime, 1-1-1/2-100; and U.S. Rubber Company #604, 1-100. The percentage of foliage killed by late blight in the various treatments was estimated on February 1, 1944, 70 days from planting date. The yield and disease control data are shown in Table 2.

Table 2. Results of spray test on potatoes with He 175 plus zinc sulfate and lime, U. S. Rubber Company #604, and copper fungicides, Homestead, Florida, 1943-44.

Materials	(lbs. - gallons H_2O)	Percentage of foliage killed by late blight 70 days after planting (estimated)	Bushels per acre	
			Total yield	U.S. No.1
Untreated - check		78	48	34
He 175 + $ZnSO_4$ - lime	1 1/2-2-1-100	6	304	293
Copper-hydro	8-100	27	188	177
Copper-hydro + $ZnSO_4$ - lime	8-2-1-100	32	135	125
Cuprocide + $ZnSO_4$ - lime	1 1/2-1-1/2-100	19	203	191
Cuprocide + $CuSO_4$ - lime	1-1-1/2-100	21	180	171
U.S. Rubber #604	1-100	2	156	145

From Table 2 it will be seen that the combination of He 175 and zinc sulfate-lime was the outstanding fungicide in the test. The organic fungicide #604 gave almost perfect control of late blight but was toxic to the foliage at the concentration used and the yields were low. The He 175 + zinc sulfate and lime combination, on the other hand, gave excellent control of late blight and plots sprayed by it very significantly outyielded those of any other treatment. Bordeaux mixture was not included in the experiment, because it has been thoroughly tested in previous years and lower yields generally have been obtained following its use in Southern Florida than with the insoluble copper fungicides. Yields in commercial fields sprayed with bordeaux mixture in the vicinity of the Experiment Station's farm ranged from 100 to 200 bushels per acre in the 1943-44 season and control of potato late blight was no better than in fields sprayed with wettable Cuprocide or with copper-hydro.

The results of these experiments and of the test in Delaware by Heuberger and Manns indicate that He 175 plus zinc sulfate-lime is a very promising fungicide for use on potatoes. The combination is now being tested on tomatoes at the Sub-Tropical Experiment Station along with com-

binations of zinc sulfate and lime with other derivatives of dithiocarbamate acid such as tetramethyl thiuram disulphide and ferric dimethyl dithiocarbamate. It is recommended that such combinations be tested by workers in other experiment stations.

FLORIDA SUB-TROPICAL EXPERIMENT STATION, HOMESTEAD

EARLY BLIGHT TUBER ROT OF POTATOES IN MINNESOTA AND THE DAKOTAS

Ian W. Tervet

It has been recognized for a long time that Alternaria solani reduces yields in potatoes as a result of heavy vine infection. However, relatively little loss from the tuber rot phase has been reported, and work on this problem has been limited. Records of the incidence of tuber rot in years prior to 1943 in Minnesota and the Dakotas are lacking but there is reason to believe that sporadic outbreaks of the disease on the tubers have occurred in past years. It appears that somewhat more tuber rot in the 1943 crop occurred in Minnesota and North Dakota than in any previous year, but how much heavier the losses were in 1943 than in earlier years is impossible to determine.

Mr. Henry Regnier of the Minnesota Seed Potato Certification Office states that he found Alternaria tuber rot in samples of Minnesota potatoes sent to Florida for test. Those lots of Triumphs from the lighter soils in Minnesota tended to be infected with a tuber rot, while Triumphs from the heavier soils appeared clean; as much as 100% of the tubers in some lots were infected to some degree. In late December, 1943, inspection in Minnesota storage of many of the lots of Triumphs, that later showed early blight when shipped to Florida, did not disclose any infected tubers. However, by February, 1944, some of these Triumphs were beginning to show lesions. Mr. Regnier stated that in a past year a consignment of Triumphs sent from Minnesota to Florida was found to be moderately infected with Alternaria rot, while the remainder of this lot of Triumphs kept in storage in Minnesota did not show any rot whatsoever at any time throughout their storage period.

The loss to the potato crop of Minnesota and the Dakotas from Alternaria tuber rot has been slight, yet individual growers have suffered rather severe loss in some cases. Heavy tuber infection was seen by the writer in only one lot of potatoes in Northern Minnesota, this lot having been grown in St. Louis County. Produce inspectors reported very little Alternaria tuber rot in the Red River Valley in Minnesota, although some lots of Red Warbas were slightly infected. An inspection trip made in the middle of March throughout the northern potato growing regions in Minnesota disclosed only one lot of potatoes infected to any degree with Alternaria tuber rot. This lot of White Warbas was grown in West Polk County and were in storage in Aitkin County. The top 2 to 3 feet of the bin had heated and only tubers from this section of the bin were infected with Alternaria tuber rot. The remainder of the bin was free from Alternaria lesions. No other lots of tubers in Clay, Polk, Red Lake, Pennington,

Koochiching, and Beltrami Counties were seen to be infected in March, and produce inspectors stated that they did not find Alternaria tuber rot in potatoes stored on farms. A detailed survey of stored potatoes in the Red River Valley in North Dakota was made in January, 1944, to determine the incidence of Alternaria rot on tubers. This rot was found in 3 localities only; at 2 regions in Grand Forks County, and one point in Walsh County. In North Dakota one warehouse had many infected Red Warbas, but Cobblers and Triumphs stored there were clean. A second warehouse had Cobblers and Chippewas infected, but not all of the Cobblers or Chippewas stored in that warehouse were infected, even though the stock with no tuber rot had been grown in the vicinity of stock with much tuber rot and was stored under apparently similar conditions. There did not appear to be any direct relation between the intensity of vine infection and tuber infection. In South Dakota, one report of severe Alternaria rot was received from Clark County.

By the courtesy of C. O. Rost of the Soils Division, University of Minnesota, samples of several varieties of potatoes grown on different soils types in northwest Minnesota and with different fertilizer treatments were examined for tuber rot. These potatoes had been stored under relatively unfavorable conditions, the temperatures in storage remaining about 50° F. Very heavy infection, the lesions being large and developing deeply into the flesh, was found in the eastern part of the Red River Valley. Only slight infection occurred on the tubers from the heavy soils of the Red River Valley. Fertilizers did not affect the incidence of tuber rot, as many and as severely infected tubers being found on unfertilized plots as those to which nitrogen, phosphorus, or potash had been added, singly or in combination. From the lighter soils, an average of 25% of the tubers were infected, and from the heavy soils, 2.5%.

There does not appear to be any appreciable difference in varietal reaction to the tuber rot, for the following varieties have been infected in the 1943-44 storage period; Cobblers, Triumphs, Chippewas, Red Warbas, White Warbas, White Rose, Kasota, Pontiac, and Mesaba.

It appears that potatoes in good storage in the North may not show any symptoms of tuber rot, yet these same potatoes, when shipped to the southern potato growing regions, may become highly infected. The most severe injury to individual tubers was seen in potatoes stored at rather high temperatures at St. Paul, Minnesota, and probably high storage temperatures influence the development of the rot.

Because of the general heavy vine infection in 1943, it appears that abundant inoculum was available to infect the tubers. It is evident that tubers become predisposed to the rot, and this predisposition was probably brought about at digging time or shortly thereafter. The soil was dry at digging time, and the temperature unusually high. Bruised tubers were common. High storage temperatures were the rule during the early weeks in storage. All of these factors may have contributed to the development of the rot. It appears most probable that potatoes dug when the soil temperature is high, and placed in storage while warm are most likely to become infected. The necessity in the fall of 1943 for digging a very large crop, with less experienced and efficient help than formerly was available, accounted for the placing of many potatoes in storage

under less than optimum conditions. The very warm weather during part of the digging season was unusual. These factors apparently were mainly responsible for the development of Alternaria rot. The probability of a repetition of similar conditions in other years is not great, hence little alarm need be felt in regard to Alternaria tuber rot in Minnesota and the Dakotas provided usual methods of handling the potato crop are maintained.
EMERGENCY PLANT DISEASE PREVENTION PROJECT

REPORTS ON LATE BLIGHT

LATE BLIGHT ON EGGPLANT, TOMATO, AND POTATO IN THE FLORIDA WEST COAST AREA: A survey, in company with Dr. A. L. Harrison of the Bradenton Vegetable Experiment Station, was made of tomato and eggplant fields in the Ft. Myers area to study the development of late blight (Phytophthora infestans) in those fields where its presence had been established in January [PDR 28 (4/5):116]. None of this disease was found. Apparently weather conditions (probably temperature) have been unfavorable for further development of late blight on these hosts and it has disappeared even from those fields where it was present in January.

However, the natural host of this fungus, potato, continues to be severely attacked by late blight, particularly as the plants become more than half grown. One of the noteworthy developments of the past week has been the spread of late blight to new potato fields but little more than half grown. -- C. M. Slagg, Emergency Plant Disease Prevention Project. Week ending March 18.

LATE BLIGHT ON POTATO AND TOMATO IN THE LOWER RIO GRANDE VALLEY OF TEXAS: Late blight, which has been on the increase in potato fields during March, reached epiphytotic proportions about March 16, when undusted fields began to go down around Los Fresnos, Barreda, and Brownsville, By March 18, most of these fields had lost all green foliage and the stems were dying. In these fields the crop is a total loss since most of the plants were approaching the flowering stage. The effectiveness of dusting is strikingly demonstrated in this region. Some fields have received 4 applications and to a considerable degree the spread of the fungus has been checked. In fields with fewer dustings the disease has also been controlled but to a lesser extent. One field near Brownsville with one dusting is still green, while a neighboring non-dusted field is completely brown. Since only about half of the 10,000 acres is estimated to have been dusted, the loss from late blight is evident.

The presence of late blight on the fall crop of potatoes and tomatoes (PDR, Jan. 15, p. 41) is undoubtedly responsible for its widespread occurrence on both potatoes and tomatoes this spring.

Although the bulk of the spring potato crop is confined to the area mentioned above, some potatoes are being grown at Raymondville for the first time. A small amount of late blight is present in this area, but fields have already been dusted and the disease appears to be checked. Late blight has recently (March 20) appeared in plots at the Experiment Station.

In one field volunteer tomato plants were abundant. Late blight was found on tomato plants that were growing among infected potato plants. This evidence, along with successful infections obtained by transferring late blight from tomato fruits to potatoes (a report is being prepared by Pady and Godfrey) indicates that in the Valley there exists a strain of the fungus that is capable of attacking potatoes and tomatoes with equal ease.

On tomatoes, late blight has been found in 8 fields scattered throughout the Valley, from Mission to Brownsville and Raymondville. In most fields only scattered single lesions were found. Two fields showed more extensive development of the disease, yet even there damage was so far not severe. The disease may become serious provided weather conditions are favorable, because of the unavailability of copper for dusting tomatoes, and the presence of the disease throughout the Valley in December and January on fall-planted tomatoes. The late blight in the potato region is also a threat to adjacent tomato fields. -- Stuart M. Pady, Emergency Plant Disease Prevention Project. Report for March

OTHER REPORTS ON DISEASES OF POTATO AND TOMATO

HAIR SPROUT OF POTATO IN LOUISIANA: Owing to unfavorable weather conditions upon arrival, many cars of seed potatoes were held for periods ranging from 3 to 6 weeks before planting. During this storage period the potatoes sprouted and in several instances typical hair sprout was observed. On March 2, a car of potatoes was examined at New Roads, Louisiana. From 2 sacks selected at random, 47 pounds, or 23.5%, showing typical hair sprout were found. No doubt other cars of seed having varying amounts of hair sprout were planted, and in all probability the hair sprout condition will be manifest in the fields in varying degrees as weak spindling plants. This is the first occurrence of hair sprout in sufficient amounts to warrant mention since the spring of 1938 when many seed lots showed from 10 to 65% hair sprout, and losses in the field ranged from 5 to 35%. -- L. H. Person, Louisiana Agricultural Experiment Station.

POTATO AND TOMATO DISEASES IN THE LOWER RIO GRANDE VALLEY OF TEXAS: In addition to diseases previously reported, the following have been observed on potatoes. Wilt (Fusarium oxysporum) occurs in trace amounts in most fields. Southern blight (Sclerotium rolfsii) has begun to show up in a few fields attacking stems and tubers. Mosaic (virus) and rugose mosaic (virus) are conspicuous in some of the older fields. Early blight (Alternaria solani) is present in most fields but in very small amounts, except in one field near Brownsville where infections were abundant.

On tomato, early blight is present in most fields but is not causing any appreciable damage. Wilt (Fusarium bulbigenum var. lycopersici) has been found in a few fields. A girdling of the stem has been found in 2 fields near Weslaco and Alamo. -- Stuart M. Pady, Emergency Plant Disease Prevention Project. Report for March

DISEASES OF TOMATOES GROWN FOR PLANTS IN GEORGIA: Eastern Section (Claxton area) - The greater part of the early crop, about 1,000 acres, has been planted. A survey was made on March 9, 10, and 11, of the fields that were up. Heavy rains, followed by light frosts occurred during the preceding week. There was slight damage from frost and somewhat more damage from erosion. Damping-off (almost entirely Pythium), both post- and pre-emergence, was found to be unusually severe. At least 25% of the plants had been killed, with damping-off still active. This does not necessarily mean that there will be a 25% reduction in the yield of plants and follow-up inspections will be necessary to determine actual losses. However, intermittent rains and cool weather have continued and serious damage is inevitable.

Western Section (Tifton area) - About 2,500 acres of the estimated 7-8,000 acres of tomato plants in the western section have been planted. The entirety of the planted acreage is lost. The cause of the loss is a complex of adverse weather conditions, seed deterioration in the soil, and damping-off. The contributing factors are inseparable. Unusually heavy rains (8 to 10 inches against a normal for the period of 3 to 4 inches) have occurred over the entire plant belt since the beginning of the season. A continuous water-logged condition of the soil and severe erosion has resulted. Temperatures during the period have not been abnormal.

The over-all picture of the tomato plant crop to date is worse than it has been in more than 8 years. -- G. M. Stone, Emergency Plant Disease Prevention Project. March 15.

TOMATO DISEASES IN ILLINOIS AND INDIANA GREENHOUSES: During the week ending March 18, tomatoes in greenhouses near Bloomington, Illinois were examined. Between 3 to 5% of the tomato plants in 2 greenhouse establishments were infected with a virus that appeared to be "single virus streak". Mature tomato plants that were planted in ground beds apparently were free from wilt (Fusarium oxysporum f. lycopersici), while in one greenhouse about 3% of the plants on raised benches were infected. Both the raised benches and the ground beds had been sterilized by steam prior to planting. It appeared that the sterilization of the benches and soil had not been as thorough as that of the ground beds. Occasional tomato plants were affected with a stem rot that probably was caused by Sclerotinia sclerotiorum, although no sclerotia were found on the affected parts.

During the week ending March 25, lettuce and tomatoes in 10 greenhouses near Evansville and in 3 at Vincennes were examined for disease. Lettuce and tomatoes were grown in all of the greenhouses except one, which contained only tomatoes. One or two tomato plants in each of the greenhouses was infected with a virus. The growers were removing the infected plants and it appeared unlikely that the virus diseases would cause serious losses in yield of tomatoes in the greenhouses examined. In one greenhouse about 1% of the tomato plants were affected with a stem rot (Pythium sp.). The tomato plants were interplanted with lettuce which shaded the basal part of the stems and evidently favored the development of this disease. -- R. C. Baines, Emergency Plant Disease Prevention Project.

DISEASES REPORTED ON ONIONS AND RELATED CROPS

DISEASES IN LOUISIANA: During the latter part of the week (March 12-18), surveys were made in St. James, St. Martin, Lafayette, LaFourche, and Terrebonne Parishes. The writer was accompanied by Dr. E. C. Tims, of the Louisiana Agricultural Experiment Station, except for the surveys in St. James Parish.

Garlic -- Approximately 10% of the plants in a half-acre field in St. James Parish were seriously damaged by white rot (Sclerotium cepivorum). A trace of purple blotch (Macrosporium [Alternaria] porri) was observed on leaves in a small planting at Thibodaux (LaFourche Parish). Pink root (Phoma terrestris) was found to be general, and rather serious, in small plantings near Houma (Terrebonne Parish).

Onion -- Numerous small plantings of onions are grown for seed production in these parishes. The crop, in general, is in fairly good shape at present. A gradual dying back of leaves is assumed to be caused by adverse weather conditions since there are no symptoms or signs of fungous activity. Only a trace of purple blotch was found; this was on seed stalks of plants growing at Thibodaux.

Shallots -- From 3 to 4% of the plants in a 1-acre field at Breaux Bridge, St. Martin Parish, had what appeared to be yellow dwarf [virus]. The plants were considerably stunted and there was a breaking-down of the leaves.

The Colletotrichum on shallots mentioned in previous reports was identified by Dr. D. A. Preston as C. circinans. -- Douglas C. Bain, Emergency Plant Disease Prevention Project.

ONION "BLIGHT" AND OTHER DISEASES IN TEXAS: "Blight" (cause unknown) was observed in all fields examined in the Robstown, Laredo, and Winter Garden districts. In the first-named area it appeared to be causing serious loss in extensive plantings.

Symptoms that resemble somewhat those of ~~yellow dwarf~~ (virus) were observed in most fields in the Robstown, Laredo, and Winter Garden areas (noted in an earlier report by Larsh). Around Robstown the disease affected only a small fraction of 1% of the plants. The symptoms are more prevalent in the Winter Garden district. The greatest number of affected plants was seen in a field of babosa onions near Asherton, Dimmit County, in which perhaps 0.5% of the plants showed the disease. -- George E. Altstatt and G. M. Watkins, Emergency Plant Disease Prevention Project.

A recent survey with Dr. G. H. Godfrey in the onion-growing area around Raymondville indicates that this disease is causing widespread damage. As the older leaves are killed, new leaves are formed and an off-type plant is produced with elongated thick neck and small bulb. Dead leaves are usually associated with a purple spot on which Alternaria may usually be found. Occasionally a Cercospora is also present. Southern blight (Sclerotium rolfsii) was also found on the bulbs of some onions in one field. -- Stuart M. Pady, Emergency Plant Disease Prevention Project; March 21.

In a recent survey (March 17) in the Raymondville area, the purple blotch stage of onion "blight" was prevalent. It appears that purple blotch, caused by Macrosporium [Alternaria] porri, is the prime cause of the blight in this area. In a field of onions nearing maturity, a number of plants showing seed stems were examined, and it was noted that the bolting appeared to be related to the excessive loss of leaf due to the purple blotch disease. -- George E. Altstatt, Emergency Plant Disease Prevention Project.

OTHER REPORTS ON DISEASES OF VEGETABLE CROPS

BEAN MOSAIC IN THE LOWER RIO GRANDE VALLEY OF TEXAS: Mosaic (virus) is present in most bean fields in small amounts. In some of the older fields near Brownsville the amount approaches 4%. -- Stuart M. Pady, Emergency Plant Disease Prevention Project. March 21

BEET LEAF SPOT IN TEXAS: Leaf spot (Cercospora beticola) is conspicuous in some old fields in the Lower Rio Grande Valley. In some fields south of Pharr practically every leaf was infected. -- Stuart M. Pady, Emergency Plant Disease Prevention Project. March 21

Fields in the Robstown and Winter Garden sections were virtually free from diseases, except for one planting of table beets at Batesville which showed fairly severe leaf spot. A trace of this spot was found in a small planting of swiss chard near Bishop, Nueces County. -- George E. Altstatt and G. M. Watkins, Emergency Plant Disease Prevention Project. March 1 - 10.

CABBAGE MOSAIC IN THE CAROLINAS: (Wake and Duplin Counties of North Carolina; Oconee, Orangeburg, Florence, and Kershaw Counties of South Carolina). All fields examined were infested with cabbage aphis, some to the extent of 50% of the plants. Our attention was called to one field in which about 10% of the plants were dying. Most of these plants were not heavily infested with aphis and upon close examination the trouble was diagnosed as severe mosaic. Fifty-four percent of the plants were affected by mosaic; about 20% were severely damaged by aphis. -- R. E. Atkinson, Emergency Plant Disease Prevention Project. March 6 - 17.

DISEASES OF CABBAGE AND TURNIP IN LOUISIANA: During the latter part of the week (March 12-18) surveys were made in St. James, St. Martin, Lafayette, LaFourche, and Terrebonne Parishes. The writer was accompanied by Dr. E. C. Tims, of the Louisiana Agricultural Experiment Station, except for the surveys in St. James Parish.

Several hundred acres of cabbage are grown in St. Martin Parish. Plants in this area are in the best condition of any observed in the State thus far. In many of the fields, however, a large number of immature heads are producing seed stalks. Other cruciferous plants also are producing seed unusually early this year. Near Lafayette (Lafayette Parish), black rot

(Bacterium campestre) [Xanthomonas campestris] was found to be rather common on leaves of plants grown for seed purposes. At Thibodaux (La-Fourche Parish), leaf spot (Alternaria brassicae) [presumably black leaf spot, A. circinans; see PDR 27(16): 317, footnote] was common in one field and there were indications of its becoming serious.

On turnip, leaf spot (Cercosporella albo-maculans) was found to be common and rather serious in one large field at Thibodaux. -- Douglas C. Bain, Emergency Plant Disease Prevention Project.

DISEASES OF CRUCIFEROUS CROPS IN TEXAS: Powdery mildew (Erysiphe polygoni) and leaf spot (Alternaria sp.) were common on small plantings of turnips seen at Beeville (Bell County) and Robstown (Nueces County) in the Coastal Bend region, and at Hopedale (Maverick County) in the Winter Garden district. Black leaf spot (Alternaria brassicae) [A. circinans] was moderate in a 1-acre field of broccoli and was common on cabbage at Robstown. A trace of powdery mildew was found in one cabbage field at Robstown. In a small cabbage field at Hopedale there was moderate black leaf spot and an occasional plant that had been destroyed by watery soft rot (Sclerotinia sclerotiorum). -- George E. Altstatt and G. M. Watkins, Emergency Plant Disease Prevention Project. March 1 - 10.

CARROT DISEASES IN TEXAS: Negligible amounts of aster yellows (virus) were observed in small plantings at Beeville and Robstown in the Coastal Bend area. Very serious losses from the disease were seen in most fields in the Laredo and Winter Garden districts, as recently reported in detail by Larsh. A trace of leaf blight (Macrosporium [Alternaria] carotae) was seen in one large field. Within recent days symptoms of aster yellows have been observed in carrots in 2 home gardens at College Station, Brazos County. -- George E. Altstatt and G. M. Watkins, Emergency Plant Disease Prevention Project. March 1 - 10.

CELERY DISEASES IN THE FLORIDA WEST COAST AREA: Early blight (Cercospora apii) is quite widespread and destructive on all celery in the district. Well-sprayed fields show less injury than average, but it is probable that loss at present averages 10%, and this percentage may be considerably increased if weather conditions continue favorable to the disease and if harvesting is delayed. One field was seen in which the loss from black heart (non-parasitic) was about 5%, according to the grower's estimate. -- C. M. Slagg, Emergency Plant Disease Prevention Project. Week ending March 18.

DOWNY MILDEW OF CUCURBITS IN THE FLORIDA WEST COAST AREA: A noteworthy development during the week ending March 18 has been the destructive appearance of downy mildew of cucurbits (Peronoplasmopara [Pseudoperonospora] cubensis) on all fields of cucumbers and squash in the West Coast of Florida vegetable growing areas. On March 1, no downy mildew was seen in the Bradenton area, but about 10 days later it made its appearance, and on March 14 seemed to be widespread on all squash and cucumbers in the district. It was also seen slightly earlier in the Ft. Myers area. It is most destructive on cucumbers. About 250 acres of this crop have been

surveyed, all so badly attacked as to be nearly a total loss. -- C. M. Slagg, Emergency Plant Disease Prevention Project.

PEA DISEASES IN SOUTH CAROLINA: Holly Hill is the center of the early spring English pea production area (sweet varieties, mostly Laxton's Progress) of South Carolina. Most of the fields inspected did not have any noticeable disease. Stands, however, were very poor, in some fields as low as 20%. Furthermore, only one field of the 25 or more observed was planted in double rows. Seed treatment of peas is not practiced in this area.

In one field a canker at the soil line had reduced the number of plants from a perfect stand to a scattering of plants with many gaps 10 feet long in the row. Plants seemed to be affected in groups. The canker in many cases was shredded as if attacked by the lesser corn stalk borer but this insect could not be found.

Another soil-line canker characteristically darker and more typically of fungous origin was also found. Specimens of these troubles have been sent to Dr. Leland Shanor for identification. -- R. E. Atkinson, Emergency Plant Disease Prevention Project. March 6 - 17.

SPINACH DISEASES IN TEXAS: Large acreages of spinach were examined in the Robstown, Laredo, and Winter Garden districts. White rust (Albugo occidentalis) was present on one or more leaves of almost every plant seen. Some fields had been abandoned to the disease. A field of about 10 acres at Del Valle, Travis County, showed white rust just beginning on the lower leaves. Leaf spot (Heterosporium variabile) occurred in most fields in the Laredo and Winter Garden sections. Usually no serious damage resulted from the spots. A trace of blue mold (Peronospora effusa) occurred in a field at Batesville, Zavala County. -- George E. Altstatt and G. M. Watkins, Emergency Plant Disease Prevention Project. March 1-10.

ASTER YELLOWS AND OTHER DISEASES ON VARIOUS CROPS AND WEEDS IN TEXAS: In the Lower Rio Grande Valley, a small amount of aster yellows (virus) was found in an old field of Dill near La Joya, and drop (Sclerotinia sclerotiorum) was abundant in the same field. Aster yellows was also found in a few Parsley plants near La Joya; in and around this field yellows-infected weeds were very conspicuous and 4 different species were found. Infected weed hosts for the virus include Lactuca scariola, Erigeron canadense, Erigeron sp., Parthenium histerophorus, and also an unidentified weed resembling carrot, in the Umbelliferae. This latter weed has been found growing in carrot fields with what appears to be carrot leaf blight (Macrosporium [Alternaria] carotae). -- Stuart M. Pady, Emergency Plant Disease Prevention Project. Report for March.

A trace of aster yellows occurred in a small planting of Dandelion (Cichorium cataloma) at Robstown. Within recent days symptoms have been observed in the roadside weed Lactuca scariola, at College Station, Brazos County. -- George E. Altstatt and G. M. Watkins, Emergency Plant Disease Prevention Project. March 1 - 10.

DISEASES OF POTATO AND SWEETPOTATO IN STORAGE IN TENNESSEE

R. A. Hyre

Potato -- One lot of Sequoia potatoes being graded was observed on the Cumberland plateau. A small amount of spindle tuber (in the Sequoia variety the diseased tubers are pear shaped with the bud end large) was found. State inspector Thompson said that spindle tuber was the only virus disease of consequence on the plateau last year. Rootknot nematodes on the Sequoia variety increased alarmingly. With a state tolerance of zero he rejected from 35 to 40% of the Sequoia entered for certification. Numerous puzzling cases of nematodes appearing on potatoes grown on new land were encountered.

Sweetpotato -- Two days were spent with State Inspector Wallace inspecting sweetpotatoes in an electrically heated, insulated house at Greenback, Tennessee. The estimated loss in nearly 6000 bushels of seed and table stock was 35 to 40%, about 2300 bushels. At $2.50 a bushel the loss would be $5750. The most frequent rot encountered was an end rot with symptoms often similar to that caused by Mucor racemosus as illustrated by Harter and Weimer (U.S. Dept. Agr. Tech. Bul. 99, plate 22). Soft rot, Rhizopus nigricans (and other species) was next most abundant, followed in importance by surface rot, Fusarium oxysporum, and Java black rot, Diplodia tubericola. Slight amounts of scurf, Monilochaetes infuscans, and charcoal rot, Sclerotium bataticola, and a trace of root knot, Heterodera marioni, were found. No black rot, Ceratostomella fimbriata, or stem rot, Fusarium sp., was found.

Negligence seemed to be responsible for this loss. One 600 bushel lot was a total loss. These sweetpotatoes were dug late, after the ground had frozen "three or four" times. Others were dug 3 or 4 weeks before the heat was turned on in the house to cure them. Apparently the ventilation was neglected and the temperature was reported to have been observed at 104° at least once. The ceiling and side wall boards were loosened. This house was a farmers' cooperative enterprise and was about 5 years old.

The only other sweetpotatoes inspected for certification in eastern Tennessee were in Knox County. About 600 bushels were in excellent shape and nearly disease free. No black rot or stem rot was found.

EMERGENCY PLANT DISEASE PREVENTION PROJECT. March 8 - 18.

REPORTS ON DISEASES OF CEREAL CROPS

DISEASES OBSERVED ON SMALL GRAINS IN NORTH AND SOUTH CAROLINA: During the past 2 weeks (March 6 to 17), grain fields in Wake and Duplin Counties of North Carolina and in Oconee, Orangeburg, Florence, and Kershaw Counties of South Carolina were visited. In South Carolina I was accompanied by Dr. George Armstrong.

Powdery mildew (Erysiphe polygoni) was found at Raleigh, North Carolina, in barley and wheat; and in 2-row barley at Eutawville and Chesnee in

South Carolina. In the barley fields the disease was 100% prevalent and occurred on all leaves except the one next to the top.

Leaf rust of barley (Puccinia anomala) and leaf rust of rye (P. dispersa) [P. rubigo-vera var. secalis] were present in trace amounts at Raleigh, North Carolina.

Scolecotrichum graminis was found fruiting in abundance on sheaths and blades of recently killed plants and on whitened tips of leaves on scattered plants throughout the field. This fungus was found in wheat, oats, rye, and barley, but the injury and prevalence was more common on barley and rye. The symptoms associated with the fungus were those most commonly attributed to cold injury, but temperatures since December have not been below 15° F. The identification of this fungus was confirmed by Dr. Leland Shanor.

Septoria tritici had killed the basal leaves of Marett's Purplestraw in test plots at Westminster, South Carolina. Another pycnidial fungus, probably Septoria passerinii, was abundant on the lower leaves of 2-row barley at Eutawville, South Carolina.

Leaf spot, probably Helminthosporium avenae, was found on oats at Raleigh, North Carolina, and at Florence, Hartsville, and Clemson, South Carolina. -- R. E. Atkinson, Emergency Plant Disease Prevention Project.

CROWN RUST IN LOUISIANA: Crown rust (Puccinia coronata) was found to be rather severe in one oat field near the Experiment Station at Louisiana State University. -- Douglas C. Bain, Emergency Plant Disease Prevention Project. February 28 - March 4.

DISEASES OF SMALL GRAINS IN THE COASTAL BEND AND WINTER GARDEN REGIONS OF TEXAS: Oats -- Crown rust (Puccinia coronata) showed in several infection centers in a 1-acre field at Goliad, Goliad County; was severe in several small plantings at Robstown and Calallen, Nueces County; was moderate in one field near Laredo, Webb County; and was beginning to appear in infection centers in several fields near Crystal City and in one field near La Pryor, both in Zavala County.

A trace of stem rust (Puccinia graminis) was seen in one planting near Robstown and in a field near Bishop, both in Nueces County. A small amount was also seen in one field near Crystal City.

Barley -- Net blotch (Helminthosporium teres) was severe in a small experimental planting at Beeville, Bee County. Spot blotch (H. sativum) was severe on a small planting at Robstown, which also showed a moderate amount of covered smut (Ustilago hordei) [U. jensenii]. In a mixed winter pasture of oats and barley at Crystal City the barley showed considerable powdery mildew (Erysiphe graminis). -- George E. Altstatt and G. M. Watkins, Emergency Plant Disease Prevention Project. March 1-10.

Wheat -- Stem rust has been observed on a small trial planting at Robstown. Leaf rust (P. triticina) [P. rubigo-vera var. tritici] is also present. Both rusts are confined to a few plants. The variety is Austin, and the rusts were first noted on March 18. George E. Altstatt, Emergency Plant Disease Prevention Project.

FLAX DISEASES IN TEXAS: In the Lower Rio Grande Valley, in the flax field near La Feria, southern blight (Sclerotium rolfsii) is now beginning to appear. Pasmo (Phyctaena linicola) [Sphaerella linorum] has also been found in this field but it is not serious. --Stuart M. Pady, Emer-

gency Plant Disease Prevention Project. March 21.

In the Robstown area pasmo was first observed by Mr. E. S. McFadden in one field of Norse flax southeast of Robstown on March 2. This field was severely affected, and the owner estimates that the yield will be reduced from a potential yield of 20 bushels to about 6 bushels per acre.--George E. Alstatt, Emergency Plant Disease Prevention Project.

DISEASES REPORTED ON LEGUMINOUS FORAGE AND COVER CROPS

STEM ROT ON ALFALFA AND CLOVERS IN TENNESSEE: During the period March 8 to 18, a survey was made for stem rot, caused by Sclerotinia trifoliorum, on alfalfa and other legumes. Fields were observed in the following counties: Blount, Bradley, Cumberland, Knox, Loudon, McMinn, Monroe, Putnam, and Roane. On alfalfa seeded in the fall of 1943, no stem rot was found in 76 acres in 5 fields, whereas from a trace to 50% of the plants were killed in 64 acres in 9 fields. On the worst field seen alfalfa was seeded last fall following an unsuccessful seeding of alfalfa the preceding fall. In another field with 40% of stem rot alfalfa had been unsuccessful 2 years previously.

Specimens of stem rot on fall-seeded alfalfa were sent in to the Experiment Station at Knoxville from the 3 additional counties of Hamblen, Montgomery, and Rhea. One county agent in 4 contacted reported complaints from farmers on fall-seeded alfalfa.

On 236 acres in 20 fields of older alfalfa a trace of stem rot was found on 15 acres in 2 fields.

A trace of stem rot was found on 6 of the 106 acres in 9 fields of crimson clover examined. None was seen on 10 acres of red clover. -- R. A. Hyre, Emergency Plant Disease Prevention Project.

DISEASES ON AUSTRIAN WINTER PEAS IN THE CAROLINAS: Peas planted in November at Raleigh, North Carolina, were growing poorly and upon digging the roots were found severely knotted and gnarled as if attacked by the rootknot nematode. Owing to the cold weather that has obtained since planting time it was considered questionable whether the nematode could be concerned, but the trouble was identified by Dr. G. L. Steiner as due to Heterodera marioni.

At Florence, South Carolina, a poorly developing field of peas was about 50% infected by the Ascochyta canker complex.

The planting of Austrian winter peas has been discouraged because of the prevalence of these 2 troubles, but many farmers still prefer this cover crop. -- R. E. Atkinson, Emergency Plant Disease Prevention Project. March 6 - 17.

DISEASES REPORTED ON FRUIT CROPS

APPLE DISEASES IN PENNSYLVANIA IN 1943: Results of orchard surveys made in 1943 are summarized in the accompanying table (page 257). -- R. S. Kirby, Pennsylvania State College.

Apple Diseases in Pennsylvania: Results of Surveys in 1943. Reported by R. S. Kirby, G. L. Zundel,

Apple Diseases in Pennsylvania: Results of Surveys in 1943. Reported by R. S. Kirby, G. L. Zundel, L. O. Weaver, and O. D. Burke

Sprays applied	No. orchards visited	Number of apples counted	Percentage of diseases on fruit										Total[b]
			Scab[a]	Brooks spot	Sooty blotch	Blotch	Black rot	Bitter rot	Apple rust	Quince rust	Black pox	Blister spot	
Complete - all 6 recommended sprays applied	111	33015	2.56	0.47	0	0	0.03	0.003	0.40	0.05	0		3.5
Partly complete	193	45225	24.10	3.40	1.13	0.05	0.16	0.008	0.31	0.13	0.18	0.007	29.1
Unsprayed	33	2419	81.00	16.10	23.10	0.70	1.66	0.540	0.04	0	0.79		124.0
State total	337	80659											
All 6 sprays applied but -													
Poor method	18	2860	40.00	7.30	0.27	0.14	0.24				0.20		43.4
Poor timing	20	4514	26.00	0.04			0.02		0.31				26.3
Substitute materials	3	600	10.10	5.30			0.30						15.3
Some sprays omitted -													
1 out of 6	54	14438	15.30	1.80	0.10	0.10	0.09		0.14	0.04	0.01		17.8
2 out of 6	48	12025	25.00	2.20	1.50		0.13		0.04	0.05	6.10	0.020	29.8
3 out of 6	23	4078	29.80	0.90	0.20		0.17	0.070	2.20	0.04			33.5
4 out of 6	19	2775	40.90	10.70	6.80	0.40	0.50	0.030			0.07		59.3
5 out of 6	6	988	39.20	24.80	9.90	0.50	1.60				0.20		76.7
All but one spray applied - the named spray was omitted													
Pre-pink	20	5163	21.40	0.05			0.02		0.07		0.02		23.0
Pink	6	1550	7.10	0.06			0.50		0.06	0.12			7.75
Petal-fall	6	1200	21.70	1.00			0.10		0.70	0.70			23.7
1st cover	7	2000	11.00	1.50			0.10		0.20	0.10			12.80
3d cover (mid June)	5	1000	7.40	10.70	0.60								12.70
4th cover (mid July)	10	2325	18.90	4.60	0.21	0.10	0.10						23.60

[a] Scab, Venturia inaequalis; Brooks spot, Mycosphaerella pomi; sooty blotch, Gloeodes pomigena; blotch, Phyllosticta solitaria; black rot, Physalospora obtusa; bitter rot, Glomerella cingulata; apple rust, Gymnosporangium juniperi-virginianae; quince rust, G. clavipes; black pox, Helminthosporium papulosum; blister spot, Pseudomonas papulans.

[b] Sum of individual disease percentages.

BROWN ROT OF STONE FRUITS IN CENTRAL CALIFORNIA: During the week ending March 11 a survey was made in Contra Costa County, the southern part of Alameda County, and the northern part of Santa Clara County for blossom blight of almonds and apricots due to Sclerotinia [Monilinia] laxa or S. [M.] fructicola. At this time the apricots and some varieties of almonds were not yet in full bloom. In general, only a small amount of blossom blight was present in these areas and a relatively small number of collections were made. Later collections from these areas may show more infection, especially if weather conditions are more favorable for the development of the disease. In most places the blossoms seemed to be well protected by sprays.

Some new twig infections on almond were observed for the first time this season in the vicinity of Antioch and Oakley in Contra Costa County. The infections were more common on young faster-growing trees than on older trees. The percentage of infection of the twigs at this time was less than 1. Isolations from the limited number of blossom collections of both almond and apricot have yielded only S. laxa.

An examination was made of the old almond fruits still hanging on the tree in this area. A few fruits showing abundant conidial tufts of the brown rot fungus were found in 2 trees, both of which showed heavy last-year twig infection. All cultures obtained from these almond fruits proved to be S. laxa. (Note: during the survey of brown rot on stone fruit mummies in California (PDR 28(6):181) no infected almond fruits were found).

Considerable time was spent searching for the apothecia of the brown rot fungus in apricot and prune orchards in Santa Clara County. Although moisture conditions appeared to be favorable for their development, no apothecia were found. -- Horace L. Barnett, Emergency Plant Disease Prevention Project.

INJURY TO PEACH TREES IN WEST VIRGINIA: On a trip last week I found a considerable amount of what appears to be arsenical injury on peach. Some of the injury may be due to sunscald. This injury appears to be general. In some cases the arsenical type of injury is present on 1941, 1942, and 1943 wood. -- Carlton F. Taylor, Emergency Plant Disease Prevention Project. March 23.

CONDITION OF NURSERY STOCK IN TENNESSEE: One day was spent with State nursery inspector Wallace at Cleveland, Tennessee. At this nursery 47,000 budded stock, of which 90% was peach, was loosened but not shaken late in November and left in place. At this delayed inspection, galls were found on 1% of the trees, part of which at least were crown gall, Agrobacterium tumefaciens. The inspector informs me that this small amount was unusual in east Tennessee this year, usually a greater percentage of galls, up to 40%, being found. In this nursery over 50% of the stock was destroyed by the peach tree borer. Generally, however, loss from the borer has been light in eastern Tennessee this year. -- R. A. Hyre, Emergency Plant Disease Prevention Project. March 8 - 18.

WATER ROT AND OTHER TROUBLES OF ORANGE IN CALIFORNIA: The heavy rains of late February and early March are making for considerable water rot

or water spot of the navel orange in the Azusa area. It is initiated by absorption of water. Decay organisms such as Alternaria sp. and Penicillium follow, causing soft rot of the fruit. It has not been uncommon to see a box or more of decayed fruit on the ground under a tree and as much more rotting fruit still on the same tree. The rot appears more commonly in older groves where the sun has been unable to dry out the ground readily under and between the trees because of shading. The superintendent and general manager of one of the larger ranches, which has probably 200 acres in navel oranges, told the writer that the losses range from 25% to as high as 60% on some trees. The Thompson navel is apparently more susceptible than the Washington navel. Twenty-five percent would be a conservative estimate of the loss on those navel trees whose crops remain unharvested. In spite of all precautions taken in picking and in the packing house, it is my opinion that considerable decay will occur in transit of those navel oranges picked in the last 2 weeks or yet to be harvested.

In orchards where the common preventive spraying with Bordeaux to 3 to 4 feet from the ground has not been done, considerable loss from citrus brown rot due to Phytophthora is found.

Data as to yield of fruit, severity of attack, and percentage of infected trees is being gathered in surveys of orange groves suffering from psorosis or California scaly-bark disease [virus] and another heretofore undescribed trouble. -- Joseph S. Tidd, Emergency Plant Disease Prevention Project. March 18.

DISEASES OF STRAWBERRY IN LOUISIANA AND MISSISSIPPI: During the week ending March 4, one day was spent with Dr. A. G. Plakidas of the Experiment Station at Baton Rouge, in surveying the strawberry area in Tangipahoa Parish, Louisiana. Particular attention was focused on crown rots. Only a trace of Sclerotinia crown rot (? S. sclerotiorum) was found.

In certain poorly drained fields a small percentage of the plants showed a crown disease similar to the one observed on strawberry at Meridian, Mississippi (PDR 28 (4/9):165). This disease is very much like the Sclerotinia crown rot, but there is no damping-off of basal leaves, nor are sclerotia present on or around the plants. Nematodes and Rhizoctonia were found on plants brought in to the laboratory. It should be noted that this disease is not nearly so prevalent in Louisiana as it is in the Meridian area, and that in Louisiana it appears to be restricted to plants growing in poorly drained fields. It has been found only on plants of the Klondike variety.

Leaf spot (Mycosphaerella fragariae) was conspicuous by its absence, only a trace being seen.

Strawberries in the Meridian, Mississippi, area were examined during the following week. The percentage of plants with the crown disease, reported earlier (PDR, l.c.) appears to have increased only slightly. In Mississippi this disease has not been observed outside of the Meridian area in small plantings. A few notes of interest may be added to the first report. One field of 3 to 4 acres contains 2 types of soil, a coarse sandy loam and a clay loam. The entire acreage was located on a slope with the clay soil forming a sort of wedge, from one side, in the sandy soil. Practically none of the plants in the clay soil were diseased

but 30% or more of those in the sandy soil showed crown rot.

Apparently the farmers in this area do not replant each year, as is the case in Louisiana, but keep the same plants for 2 to 3 years or longer. All the evidence indicates that several factors are involved in the origin of this crown rot at Meridian.

An outbreak of leaf spot (Mycosphaerella fragariae) was particularly severe on plants of the Klondike variety following a recent rainy period. In early February (PDR, l.c.) infection was fairly heavy on lower and older leaves. Spraying is not practiced to any extent in this area. -- Douglas C. Bain, Emergency Plant Disease Prevention Project.

STRAWBERRY DISEASES IN EAST TEXAS: A planting of 1-1/2 acres at Gallatin, Cherokee County, contained a trace of both leaf spot (Mycosphaerella fragariae) and scorch (Diplocarpon earliana). -- G. M. Watkins, Emergency Plant Disease Prevention Project. February 21 - 25.

SOME OBSERVATIONS ON DISEASES OF WOODY PLANTS IN FLORIDA

Arthur S. Rhoads

FURTHER OBSERVATIONS ON CLITOCYBE ROOT ROT OF WOODY PLANTS

An interesting case of Clitocybe root rot, caused by Clitocybe tabescens (Scop. ex Fr.) Bres., was observed in December on a large spruce pine, Pinus glabra Walt., growing in hammock forest along Hogtown Creek west of Gainesville in Alachua County. This was a rather tall, dominant tree about 20 inches D. B. H. Attention was attracted to it by reason of the nearly dead top with its thin, pallid foliage. The tree appeared to have been dying for a number of years and beetles had recently begun working in the bark at the base. The root rot fungus was not fruiting at the base but there had been but little rainfall for the preceding 3 months. However, extensive mycelial sheets of the fungus were found to have developed between the bark and the wood at the base and also on one side. Pure cultures of Clitocybe tabescens were isolated from root material subsequently cut from this tree. This provides a new host record for the fungus, which previously had been found on conifers in Florida only infrequently on longleaf, shortleaf, slash, and sand pines, though more frequently on arborvitae (both American and Oriental) and cypresspine Callitris robusta, and occasionally on other conifers.

In September, a single, recently dead, young American arborvitae, Thuja occidentalis, one of several that had been planted on a clay bank along a road, was found to be girdled by this fungus.

An instance of the occurrence of Clitocybe root rot on an American hophornbeam tree, Ostrya virginiana (Mill.) K. Koch was observed in December in hammock forest at another point along Hogtown Creek at Gainesville. This tree had become dormant and the disease was found solely by observing the remains of old sporophores of the fungus at the base. The tree was practically girdled at the base and the roots on one side were found

to be extensively decayed. Pure cultures of Clitocybe tabescens were obtained in isolations made from root material cut from this tree. A previous instance of the occurrence of Clitocybe root rot on American hophornbeam at Gainesville was noted several years ago by Mr. Erdman West, mycologist of the Florida Agricultural Experiment Station. These cases of root rot are of interest in that they furnish additional proof of the activity of the Clitocybe root rot fungus in forest areas, where little attention usually is paid to the occurrence of this disease.

Other instances of the occurrence of Clitocybe root rot were found in December on a single Cunningham beefwood, Casuarina cunninghaminaha Miq., tree in a windbreak planting at Sanford and on 4 trees of the same species in a young windbreak planting along a citrus grove near the Longwood-Oviedo crossing on the road from Sanford to Orlando, where most of the trees apparently had died and been removed. The disease also was found girdling a single young scalybark beefwood, C. lepidophloia F. v. M., tree in another roadside planting 1/2 mile south of the aforesaid Longwood-Oviedo crossing. These localities are all in Seminole County.

Clitocybe root rot also was observed on a single tree of the latter species at Winter Park, Orange County, and on another at City Point, Brevard County, in December.

WOOD-ROTTING FUNGI OBSERVED ON LIVING TREES

Fomes geotropus Cke. was found fruiting on a southern magnolia, Magnolia grandiflora L., about 2 feet in diameter at Planera Hammock 11 miles northwest of Gainesville, Alachua County. Two small sporophores (one dead) occurred on one side of the tree about 9 feet above the base, each growing in the center of an open, circular, gnarly lesion, and accompanied by exudation of gum. This fungus was observed fruiting from a basal scar on boxelder, Acer negundo L., in Sugarfoot Hammock west of Gainesville (November 21 - December 31).

F. marmoratus (Berk. & Curt.) Cke. was observed fruiting on an old fire scar at the base of a laurel oak, Quercus laurifolia Michx., near Windsor, and also on one side of a large pignut hickory, Carya glabra var. megacarpa Sarg., between Newnan's Lake and Rochelle, Alachua County. In the latter case there was no evidence of any injury leading to the entrance of the fungus (November 21 - December 31).

Ganoderma curtisii (Berk.) Murr. was found fruiting at the base of a silkbay persea tree, Persea humilis Nash, at Altoona, Lake County (September 26 - October 23).

G. sulcatum Murr. was found fruiting at the base of a living cabbage palmetto, Sabal palmetto (Walt.) Todd., in a hammock forest at Longwood, Seminole County (September 26 - October 23).

An old sporophore of Polyporus fissilis Berk. & Curt. was found on a small southern red oak, Quercus rubra L., in Sanchez Hammock near Gainesville. While this fungus has been found on other oaks at various points in Florida as a cause of heart rot in former years, this appears to be the first record of it on southern red oak in Florida (November 21 - December 31).

P. gilvus Schw. ex Fr. was found occurring as a wound parasite on a turkey oak, Quercus laevis Walt., at Hawthorne, Alachua County (November

21 - December 31).

P. hispidus Bull. ex Fr. was found fruiting on the trunks of 4 roadside laurel oak trees at various points about De Land, Volusia County. In all but one case the sporophores were decayed, this species usually doing its fruiting during the summer in Florida (September 26 - October 23). Instances were noted on single laurel oaks at both Sanford, Seminole County, and Orange City, Volusia County, through the finding of old sporophores of the fungus on the trunks (November 21 - December 31).

P. sector Ehr. ex Fr. was found occurring as a wound parasite on a laurel oak near Hawthorne (November 21 - December 31).

P. sulphureus Bull. ex Fr. was found fruiting on the trunk of a living but decadent laurel oak at Sorrento, Lake County (September 26 - October 23).

SOUTHERN FUSIFORM PINE RUST

The southern fusiform rust (Cronartium fusiforme Hedgc. & Hunt), as evidenced by gall formation, was found to be of widespread occurrence in many sections of northern Florida, especially on shortleaf pine, Pinus echinata Mill. It was observed on this species at various points in Jefferson, Gadsden, Taylor and Dixie Counties. It frequently attacks young trees with great severity, often seriously deforming them and rendering them useless for timber production. It was also found to occur to some extent in plantings of slash pine, Pinus caribaea Morelet, in Suwannee County and is of frequent occurrence on loblolly pine, Pinus taeda L., and occasionally on slash pine in the vicinity of Gainesville in Alachua County (July 25 - August 31).

It was observed attacking the trunks, limbs, and even small branches of young loblolly pine trees in an area west of Waukeenah, 2 miles east of the western boundary of Jefferson County, frequently deforming the trees. (September 1 - 25).

ADDITIONAL RECORDS FOR MISTLETOE

A considerable number of additional records of hosts and localities for mistletoe have been made incidentally during the course of travel about the State in November and December.

Two species, in addition to the ubiquitous Phoradendron flavescens (Pursh) Nutt., are recognized by Small as occurring in Florida, but in view of the great variation in leaf character exhibited by this plant under varying degrees of shading and nutrition on different hosts, the division into more than one species appears questionable. In all the observations enumerated the host has been the point of primary interest, but wherever the mistletoe has been examined it has, with the one exception noted, appeared typical of P. flavescens.

Host Records. On paper mulberry (Broussonetia papyrifera (L.) Vent.) occurring on single trees near Martin and at Ocala (Marion County).

On water hickory (Carya aquatica (Michx. f.) Nutt.), noted on a single tree planted on the Experiment Station grounds at Gainesville, and on 4 trees at Newman's Lake, near Gainesville (Alachua County).

On Florida scrub hickory (Carya floridana Sarg.), occurring on 3 trees

at the northern border of Cocoa (Brevard County).

On pignut hickory (Carya glabra var. megacarpa Sarg.), occurring on 6 trees at Newnan's Lake, near Gainesville, on 20 in Hammock forest about 10 miles northeast of Gainesville, on 4 at the Devil's Millhopper near Gainesville, on 3 on the Experiment Station grounds at Gainesville, on several trees between Gainesville and Rochelle, on a few trees along Hogtown Creek west of Gainesville (Alachua Co.); on a single tree near Paola, west of Sanford (Seminole Co.); on 6 in Levy Hammock (Marion Co.); on 2 at Silver Glen Springs, and on 4 at intersection of Juniper Creek with road 4 miles south of Silver Glen Springs (Lake Co.).

On pecan (Carya illinoensis (Wang.) C. Koch). In some places mistletoe occurs with great frequency and in great profusion on pecan trees. During the period from October 24 to November 7 it was observed on several trees in yards of residential properties at each of the following places: Gainesville, Hawthorne, Evinston, Micanopy, and between Micanopy and Payne's Prairie (Alachua Co.); Citra, Ocala, Martin, Flemington, and Dallas (Marion Co.); Dunedin (Pinellas Co.); Brooksville (Hernando Co.); Inverness (Citrus Co.); and on several trees in an old abandoned planting 3 miles east of Wildwood (Sumter Co.), and on numerous old abandoned trees in area now reverted to woods at Newnan's Lake, near Gainesville (Alachua Co.).

During December it was noted on 30 more trees at Gainesville in addition to those reported previously, on 6 in the vicinity of the Devil's Millhopper northwest of Gainesville, on 6 at Magnesia Springs, on 14 at Hawthorne in addition to the few reported previously, on 3 along Orange Lane near Hawthorne, and on 3 at Windsor (Alachua Co.); on 45 at Melrose in addition to the few reported previously, and on 3 at Ocklawilla (Putnam Co.); on 16 at Reddick, on 5 at Lowell, on a total of 43 at Martin (from which it was reported on several before), on 1 between Martin and Ocala, on 9 at Ocala in addition to those reported previously; and on 5 between Ocala and Silver Springs (Marion Co.); on 5 at De Land (Volusia Co.); on 4 at Altamonte Springs (Seminole Co.); on 1 at Winter Park, on 1 at Winter Garden, on 1 at Minorville, on 12 at Gotha, on numerous trees about Orlando (Orange Co.); on 2 at Silver Glen Springs, and on 20 at Umatilla (Lake Co.).

On mockernut hickory (Carya tomentosa (Lam.) Nutt.), occurring on 4 trees between the Devil's Millhopper and Kelly's Hammock northwest of Gainesville, on 2 trees at a point 2 miles east of Hawthorne, and 4 trees at Evinston (Alachua Co.); on 4 trees at Lowell, on 1 tree between Martin and Ocala, and on 4 trees at a point 2 miles south of Ocala (Marion Co.).

On Ashe chinkapin (Castanea ashei Sudw.), occurring on a single large tree at Newnan's Lake, near Gainesville (Alachua Co.). In this case the mistletoe agreed with the description of Phoradendron eatoni Trelease.

On southern hackberry (Celtis laevigata Willd.), occurring on a single tree at Newnan's Lake, near Gainesville, and on a single tree in Planera Hammock 11 miles northwest of Gainesville (Alachua Co.); and on another tree at Ocala (Marion Co.).

On camphor (Cinnamomum camphora (L.) Nees & Eberm.), occurring on single trees at Ocala (Marion Co.), at Gainesville (Alachua Co.), and at Melrose (Putnam County).

On Ravenel hawthorn (Crataegus ravenelii Sarg.). One very young plant was found growing on a single tree in Sugarfoot Hammock west of Gainesville (Alachua Co.).

On oneflower hawthorn (Crataegus uniflora Moench), occurring on 7 scattered trees in Sugarfoot Hammock west of Gainesville (Alachua Co.).

On persimmon (Diospyros virginiana L.), occurring on a single tree at Melrose (Alachua Co.); on 3 trees about 2 miles southeast of Melrose and on 2 trees at Ocklawilla (Putnam Co.); and on a single tree at Silver Glen Springs (Lake Co.).

On ash (Fraxinus sp.), occurring on 11 trees of an undetermined species in a small area of swamp-forest at Silver Glen Springs (Lake Co.).

On white ash (Fraxinus americana L.), occurring on 3 trees in Sugarfoot Hammock west of Gainesville, on 3 trees at the Devil's Millhopper near Gainesville, and on 3 trees in Planera Hammock eleven miles northwest of Gainesville (Alachua Co.).

On Carolina ash (Fraxinus caroliniana Mill.), occurring on 4 trees at Newnan's Lake, near Gainesville (Alachua Co.); and on a single tree at Ocala (Marion Co.), apparently this species but characterized by thick, blunt-tipped twigs that are abnormal for the genus Fraxinus.

On red ash (Fraxinus pennsylvanica Marsh.), occurring on a single tree along the Indian River at Cocoa (Brevard Co.).

On pumpkin ash (Fraxinus profunda var. ashei Palmer), occurring on single trees east of Silver Springs (Marion Co.), and at Newnan's Lake, near Gainesville (Alachua Co.).

On honey locust (Gleditsia triacanthos L.), occurring abundantly on a single tree at Reddick (Marion Co.).

On sweet gum (Liquidambar styraciflua L.), of common occurrence on trees in the hammock and swamp forests between Gainesville and Rochelle, on several trees in various areas of hammock forest around Gainesville, on 3 trees in Orange Lane, near Hawthorne, and on 3 trees at Orange Lake at Evinston, on 2 trees in an open field and on a group of several in woods along the road between Gainesville and Hawthorne, and on fully a dozen at Newnan's Lake, near Gainesville, also on a few between Micanopy and Payne's Prairie (Alachua Co.); on 6 trees in swamp forest at Astor and on 2 trees at Silver Glen Springs (Lake Co.); and on several trees in the swamp forest near Paola, west of Sanford (Seminole Co.).

On osage orange (Maclura pomifera (Raf.) Schneid.), occurring abundantly on a single tree at Martin (Marion Co.).

On swamp blackgum tupelo (Nyssa sylvatica biflora (Walt.) Sarg.), occurring on fully a dozen trees about Melrose and on 8 trees near Hawthorne, on fully 15 trees growing in a swamp forest around Newman's Lake, near Gainesville, and on a large number in a swamp forest at Micanopy (Alachua Co.). This tree is one of the preferred hosts for mistletoe and the plant frequently occurs in great profusion on large numbers of trees.

On devilwood osmanthus (Osmanthus americanus (L.) Gray), noted on a single tree at Gotha (Orange Co.).

On water elm (Planera aquatica (Walt.) Gmel.), occurring on at least 10 trees in local areas around two small ponds in Planera Hammock eleven miles northwest of Gainesville (Alachua Co.).

On sycamore (Platanus occidentalis L.), occurring on a single tree at Altamonte Springs (Seminole Co.), and on another tree 3 miles north of De Land (Volusia Co.).

On Chickasaw plum (Prunus angustifolia Marsh.), noted on a single tree at Newman's Lake, near Gainesville, and on a single tree on the Experiment Station grounds at Gainesville (Alachua Co.).

On Carolina laurelcherry (Prunus caroliniana (Mill.) Ait.), occurring on 4 trees at Floral City (Citrus Co.); and on 1 at Gainesville (Alachua Co.); on single trees at Melrose (Putnam Co.) and at Martin (Marion Co.); on 4 trees at a point three miles north of De Land (Volusia Co.); on 2 at Orlando, on 1 at Minorville, and on 2 at Gotha (Orange Co.).

On black cherry (Prunus serotina Ehrh.), occurring on 3 trees at Magnesia Springs, on 3 at Gainesville, on 2 at Newnan's Lake near Gainesville and on 1 between Newnan's Lake and Hatchet Creek near Gainesville, on 1 at a point one mile east of Hawthorne and on 5 along Orange Lane, near Hawthorne (Alachua Co.); on 1 at Citra, on 1 between Sparr and Ocala, on 2 at Belleview, on 4 at Martin, on 2 between Martin and Ocala, on 6 at Ocala, on 2 between Ocala and Silver Springs, on 1 at Lynne, and on 2 at Lake Bryant Ranger Station, 20 miles east of Ocala (Marion Co.); on 1 at Fort Meade (Polk Co.); on 3 at Dunedin (Pinellas Co.), on 2 at Inverness and 1 at Hernando (Citrus Co.); on 3 at Melrose (Putnam Co.); on a single tree at De Leon Springs, on 5 trees at De Land, on 2 between De Land and Orange City, and on 1 a mile north of Orange City (Volusia Co.); on 2 at Sanford, on 1 at Paola west of Sanford, on 3 at Oviedo, and on 5 at Altamonte Springs (Seminole Co.); on 1 at Winter Park, on 1 tree a half-mile south of Tildenville, on 4 trees at Minorville, on 2 at Ocoee, on 1 at Winter Garden, on 5 at Gotha, and on 1 about two miles west of Bithlo (Orange Co.); on 5 at Umatilla, on 26 at Eustis, on 5 at Tavares, and on 3 at Leesburg (Lake Co.).

On flatwoods plum (Prunus umbellata Ell.), occurring on 3 trees at Melrose (Putnam Co.).

On pear (Pyrus sp.), occurring on a single tree of unknown variety 2 miles southeast of Melrose (Putnam County).

On sand pear (Pyrus pyrifolia (Burm.) Nakai), occurring on several old trees in an old abandoned planting 7-1/2 miles north of Ocala on the road from Citra (Marion Co.), and on a single tree of unknown variety in a residential property at Island Grove (Alachua Co.).

On Chapman oak (Quercus chapmanii Sarg.), occurring on a single tree east of Lake Bryant Ranger Station, 20 miles east of Ocala (Marion Co.); and on 6 trees in scrub area at Altoona (Lake Co.).

On bluejack oak (Quercus cinerea Michx.), occurring on a single tree at Magnesia Springs, on 4 trees at Hawthorne, on 1 tree along Orange Lane near Hawthorne (Alachua Co.); on 4 at Melrose and on 1 at Ocklawilla (Putnam Co.); on a single tree at Ocala, on 5 trees at Lynne and frequent in the vicinity of Lake Bryant Ranger Station twenty miles east of Ocala (Marion Co.); on several trees along the road between Astor Park and Altoona and also at Eustis and Tavares (Lake Co.); on 1 tree a mile north of Orange City (Volusia Co.); on 1 at Winter Park, on 2 at Minorville, and on 1 tree about four miles west of Bithlo (Orange Co.); on 2 at Lake Wales (Polk Co.); on several trees at Sebring and occurring with

great frequency on great numbers of scrubby trees of this species in the scrub area from De Soto City south to Lake Placid (Highlands Co.); on a single large tree at Clearwater, on 6 trees at Dunedin and on a single one at a point four miles north of Dunedin (Pinellas Co.).

On sand live oak (Quercus geminata Small), occurring on a single tree in Sugarfoot Hammock west of Gainesville (Alachua Co.); on 1 tree a mile west of Lynne (Marion Co.); and on 1 at Altoona (Lake Co.).

On turkey oak (Quercus laevis Walt.). From October 24 to November 7 observed on occasional trees in the woods from Frostproof south to Sebring (Polk and Highlands Co.) and with great frequency from the vicinity of De Soto City south to Lake Placid (Highlands Co.); also on a single tree at Ocala (Marion Co.), on 2 at Clearwater (Pinellas Co.), and on 9 at Floral City (Citrus Co.). Also of sporadic occurrence on oaks in woods, chiefly Quercus laevis and, to a lesser extent, Q. laurifolia, from Floral City through Inverness to Herando in Citrus Co. and north to the southern boundary of Marion Co. The occurrence of mistletoe on this host also was noted subsequently at Zellwood (Orange Co.).

In December mistletoe was noted on a single tree 10 miles northwest of Gainesville, on 1 at Hawthorne, and on 1 in Orange Lane, near Hawthorne (Alachua Co.); on 8 at Melrose and on 7 at Ocklawilla (Putnam Co.); on 1 between Martin and Ocala, on 2 between Ocala and Silver Springs, on 12 a mile west of Lynne, and was of frequent occurrence in the vicinity of Lake Bryant Ranger Station 20 miles east of Ocala (Marion Co.); of frequent occurrence along road from Astor Park south to Altoona and also at Umatilla, Eustis and Tavares (Lake Co.); on 5 trees south of Altamonte Springs on the road to Maitland (Seminole Co.); on 1 at Winter Park, on 2 in the Black Lake section 3 miles south of Tildenville, on 3 at Minorville, and on 1 at Gotha (Orange Co.).

On hybrid oak (Quercus laevis x nigra), occurring on a single tree between De Land and Orange City (Volusia County).

On hybrid oak (Quercus laevis x laurifolia), occurring on a single tree at Sebring (Highlands County).

On laurel oak (Quercus laurifolia Michx.). Aside from the myrtle oak and possibly the bluejack oak in certain scrub areas in the State, mistletoe appears to occur with greater frequency and to have a wider distribution in the State on the laurel oak than on any other tree. This is due largely to the fact that this oak has been so frequently planted as a shade tree in so many cities and towns. Mistletoe may be found growing more or less profusely on many of the older laurel oaks in nearly every city or town visited where they occur, with decidedly detrimental results to the trees in time. In some cases, not only in laurel oaks, but also in other trees, the mistletoe may largely replace the upper portion of the crown and sometimes there is more mistletoe than tree crown. At Sanford mistletoe was observed to occur in the majority of the o l d e r laurel oaks examined, being noted in 155 trees in looking over these trees as they occurred in and around 2 parks of a city block each in extent and in plantings in several blocks of the residential section in but a small portion of the city. In addition to city plantings the mistletoe occurs frequently on these trees growing naturally in the woods. The following records of occurrence gathered mostly in driving

through various cities incidental to travel will give some idea of the wide distribution of this parasitic plant throughout a portion of central Florida. Records reported previously have not been included.

During the period from October 24 to November 7 mistletoe was noted on a considerable number of trees at Gainesville (Alachua Co.) and at Ocala (Marion Co.), on a few trees at both Citra and Dallas (Marion Co.), and at Hawthorne (Alachua Co.), on 5 at Lake Wales (Polk Co.), on 9 at Clearwater and 6 at Dunedin (Pinellas Co.), on 4 at Brooksville (Hernando Co.), on 3 at Floral City and on several at both Inverness and Hernando (Citrus Co.).

In December it was observed on several trees in Sugarfoot Hammock west of Gainesville, on 2 at Windsor, on 11 at Magnesia Springs, on 17 at Hawthorne, on 31 along Orange Lane near Hawthorne (Alachua Co.); on 12 at Ocklawilla (Putnam Co.); on 9 at Reddick, on 36 at Martin, on 3 between Martin and Ocala, on numerous trees about Ocala, on 4 between Ocala and Silver Springs, on 2 at Silver Springs, and on 2 east of Lake Bryant Ranger Station 20 miles east of Ocala, and on 1 at Juniper Springs (Marion Co.); on several at Leesburg (Lake Co.); on 1 about 3 miles north of De Land, and of frequent occurrence on a considerable number of the older trees about De Land, on 8 between De Land and Orange City, and on 2 at Orange City (Volusia Co.); on 155 at Sanford, on 17 at Altamonte Springs, on 3 between Altamonte Springs and Maitland, on 6 at Oviedo (Seminole Co.); on numerous trees at Winter Park, on 1 at Oakland, on 1 at Tildenville, on several at Ocoee, on several at Minorville, on 3 at Gotha, on 1 about four miles west of Bithlo, on 8 about one-and-one-half miles north of Christmans, and on 6 about one-and-one-half miles west of the Orange-Brevard Co. line on the Cheney-Dixie highway (Orange Co.); on 20 at the north end of Cocoa, on numerous trees at City Point, and on several at Sharpes (Brevard Co.).

On myrtle oak (Quercus myrtifolia Willd.), occurring in great profusion on vast numbers of small trees in the scrub area from De Soto City south to Lake Placid (Highlands Co.), of frequent occurrence in scrubby woods east of Lake Bryant Ranger Station, twenty miles east of Ocala (Marion Co.); on 3 trees in a clump of scrub four miles east of Tavares (Lake Co.); on 7 trees in a small area of scrub one mile south of Orange City (Volusia Co.); on 5 trees at Orlovista, on 13 trees in a clump of scrub four miles west of Bithlo (Orange Co.); on a single large tree in a yard and on 5 small ones in scrub at Cocoa (Brevard Co.).

On water oak (Quercus nigra L.), occurring on several trees in Sugarfoot Hammock west of Gainesville, on a single tree at Windsor, on 9 trees at Magnesia Springs, on 12 along Orange Lane near Hawthorne, on 13 additional trees at Melrose, on 5 at Gainesville and on a few at Hawthorne (Alachua Co.); on a single tree at Ocala, on 3 trees at Reddick, on 3 at Lowell, and on 4 at Martin (Marion Co.); on a single tree at Sebring (Highlands Co.); in extreme profusion in one large isolated tree at Barberville, on 1 tree between De Leon Springs and De Land, on 15 between De Land and Orange City (Volusia Co.); on 1 tree at Sanford, on 3 at Altamonte Springs (Seminole Co.); on 5 at Maitland and on 3 at a point three miles west of Orange-Brevard County line on Cheney-Dixie Highway (Orange Co.).

On southern red oak (Quercus rubra L.), occurring on a single tree near the Devil's Millhopper northwest of Gainesville and on another tree at Magnesia Springs (Alachua Co.); on 2 trees at Reddick, on 5 at Martin, on 20 between Ocala and Silver Springs, on several large shade trees at Ocala and on a single tree in woods at Dallas (Marion Co.).

On shumard oak (Quercus shumardii Buckl.), occurring on a single tree in Planera Hammock 11 miles northwest of Gainesville (Alachua Co.).

On post oak (Quercus stellata Wang. var. arenosa Sarg.), occurring on a single tree at Floral City (Citrus Co.), and on a single tree about 2 miles southeast of Melrose (Putnam Co.).

On live oak (Quercus virginiana L.), occurring on 3 trees at Melrose (Putnam Co.); on single trees at Gainesville (Alachua Co.) and at Dunedin (Pinellas Co.). While of frequent occurrence on many oaks, mistletoe appears to occur but very rarely on live oak.

On Florida linden (Tilia floridana Small), occurring on 2 trees on the Experiment Station grounds at Gainesville and on 6 trees in Planera Hammock eleven miles northwest of Gainesville (Alachua Co.).

On winged elm (Ulmus alata Michx.), occurring on a single tree in Sugarfoot Hammock west of Gainesville (Alachua Co.), and on another tree at Reddick (Marion Co.).

On American elm (Ulmus americana L.), occurring on a single tree along the Indian River at Cocoa (Brevard Co.).

On Florida elm (Ulmus floridana Chapm.), occurring on a single tree at Ocala (Marion Co.).

On Siberian elm (Ulmus pumila L.), occurring on a single tree on the Experiment Station grounds at Gainesville (Alachua Co.).

On herculesclub pricklyash (Zanthoxylum clava-herculis L.), occurring on 2 trees at Floral City (Citrus Co.); on 8 at Martin (Marion Co.); on 2 between Gainesville and Rochelle (Alachua Co.); and on 3 at Cocoa (Brevard Co.).

Leaf Blight of Mistletoe.

Leaf blight (Sphaeropsis visci (Westend.) Archer) has been found at a number of additional points in the State and appears to be of frequent and widespread occurrence. It attacks the stems as well as the leaves. Since the last report this disease has been collected on mistletoe as follows:

During the period October 24 to November 7 it was found fruiting abundantly on leaves of plants growing on scrubby myrtle oak and on blue-jack oak in the scrub forest in the vicinity of De Soto City (Highlands Co.); also on plants growing on pecan and on swamp blackgum tupelo at Newman's Lake, near Gainesville (Alachua Co.).

In December it was collected on mistletoe on Chapman oak and myrtle oak east of the Lake Bryant Ranger Station and on turkey oak between Ocala and Silver Springs in Marion County; on water oak at Melrose, laurel oak near Hawthorne, on waterelm 11 miles northwest of Gainesville, and on Herculesclub pricklyash between Gainesville and Rochelle in Alachua County; on flatwoods plum at Melrose on the Putnam County side of the line; and on hybrid oak between De Land and Orange City in Volusia County.

Other Fungi on Mistletoe.

A small collection of one of the felty fungi (Septobasidium pseudopedicellatum Burt) was made on living twigs of mistletoe on Zanthoxylum clava-herculis between Gainesville and Rochelle. This constitutes a new host record for this fungus.

Aschersonia cubensis Berk., the conidial stage of Hypocrella epiphylla (Mass.) Sacc., was found extensively parasitizing pyriform scale (Pulvinaria pyriformis (Ckll.) on the leaves of mistletoe at Black Lake, Melrose (Alachua Co.). Large masses of mistletoe were cut from two of several water oaks that were attacked by this parasite. Examination showed that a goodly percentage of the leaves of the mistletoe from both trees exhibited scale insects, virtually all of which were parasitized by the Aschersonia. Most of this fungus on the scale insects, particularly on one tree, was extensively overgrown by a Cladosporium. The same fungus, likewise extensively overgrown by Cladosporium, was found parasitizing pyriform scale on mistletoe on laurel oak near Hawthorne (Alachua Co.) and on turkey oak near Lynne, on the Ocala National Forest (Marion Co.).

Tryblidiella fusca (Ell. & Ev.) Rehm was collected on twigs of a dead plant on myrtle oak near Orange City in Volusia County; this is a new host record for this fungus.

OTHER PHANEROGAMIC PARASITES ON WOODY PLANTS

Additional Observations of Dodder on Woody Plants. Cuscuta compacta Juss. occurred abundantly on buttonbush, Cephalanthus occidentalis L., in one small area along the margin of Black Lake at Melrose and in another at Orange Lake at Evinston, Alachua Co. In the former locality a trace of it was observed on Virginia sweetspire, Itea virginica L. It was also found occurring abundantly on buttonbush and on coastalplain willow, Salix longipes Anders., and to a limited extent on peppervine ampelopsis, Ampelopsis arborea (L.) Rusby, at Lake Alice, Gainesville. The same species was also found occurring abundantly on southern waxmyrtle, Myrica cerifera L., on the border of a swamp area in pine flatwoods at Micanopy, Alachua Co. In addition to waxmyrtle it was also found attacking gallberry, Ilex glabra (L.) A. Gray, red chokeberry, Aronia arbutifolia Spach, he-huckleberry, Lyonia ligustrina (L.) DC., possumhaw viburnum, Viburnum nudum L., and St. Andrews cross, Ascyrum hypericoides L. In all these cases the dodder had been killed by cold but undoubtedly will reinfect the same plants from seedlings that spring up from the ground later in the season (November 21 - December 31).

Squaw-root on Laurel Oak. Clumps of squaw-root (Conopholis americana (L. f.) Wallr.) were found growing from roots of laurel oak, Quercus laurifolia Michx., in Sanchez Hammock 10 miles northwest of Gainesville, Alachua Co. (November 21 - December 31).

NOTES ON THE OCCURRENCE OF SEPTOBASIDIUM SPP. AND OTHER FUNGI PARASITIZING INSECTS ON WOODY PLANTS

A number of species of Septobasidium occur more or less frequently on trunks, branches and twigs of various trees infested by scale insects in the hammock forests of north central Florida. Frequently 2 or more species of this fungus may occur in close association on the same tree, or on the same branch or twig.

Septobasidium castaneum Burt occurs rather commonly on laurel oak Quercus laurifolia Michx., water oak, Q. nigra L., and sweet gum Liquidambar styraciflua L., in the vicinity of Gainesville and also was collected on laurel oak at Evinston, and on red maple, Acer rubrum L., at Gainesville, Alachua County. In scrubby woods at De Soto City, Highlands Co.; it was found growing on a few plants of bigflower pawpaw, Asimina triloba (Willd.) Nash; this collection constitutes the first known record of this species of felty fungus on this host in Florida.

S. pseudopedicellatum Burt, which also is of frequent occurrence, was collected on laurel oak at both Gainesville and Evinston, and on sweet gum and American hornbeam, Carpinus caroliniana Walt., at both Gainesville and Evinston, on sweet gum at Silver Springs and at the Ocklawaha River several miles east of Silver Springs, Marion County, on Carolina ash, Fraxinus caroliniana Mill., near Windsor and on Florida ash, F. pauciflora Nutt., at Gainesville, on small-fruited dogwood (Cornus microcarpa Small) at Silver Springs, and on mistletoe (Phoradendron flavescens (Pursh) Nutt.), between Newnan's Lake and Rochelle, Alachua County. The last 4 collections constitute new host records for this fungus.

S. langloisii Pat. was found forming extensive bluish patches a foot or more in length on trunks of American hornbeam and was also found sparingly on Florida ash, Fraxinus pauciflora Nutt., at Gainesville. This species was collected also on Virginia sweetspire, Itea virginica L., at Black Lake, Melrose in Alachua County. The last 2 collections constitute new host records for this fungus.

S. sinuosum Couch was collected on twigs of sweet gum at both Silver Springs and at the Ocklawaha River several miles east of Silver Springs.

S. leprieuri (Mont.) Pat. was found forming extensive patches confluent for several feet on a sapling of sweetbay magnolia, Magnolia virginiana L., at Melrose. S. curtisii (Berk. & Desm.) Boed. & Stein. and S. langloisii Pat. also occurred in association with it. S. curtisii also was found occurring commonly on twigs and branches of swamp black gum tupelo, Nyssa sylvatica biflora (Walt.) Sarg., at both Melrose and Sanchez Hammock 10 miles northwest of Gainesville.

S. fumigatum Burt was of common occurrence on trunks and branches of red maple at Lake Alice, Gainesville, growing on gloomy scale (Chrysomphalus tenebricosus (Comst.) and forming patches of considerable extent. A continuous patch about 30 inches long completely enveloped a portion of one trunk fully 6 inches in diameter and confluent patches of much greater extent were observed on saplings.

Collections of S. pseudopedicellatum Burt and S. castaneum Burt, made jointly with Mr. Erdman West, mycologist of the Florida Agricultural Experiment Station, on twigs and branches of oneflower hawthorn, Crataegus

uniflora Moench, also constitute a new host record for these respective fungi. A small collection of S. rugulosum Couch on swamp black gum tupelo in Sanchez Hammock, likewise made with Mr. West, also adds a new host record for this fungus. The latter specimen was determined by Dr. J. N. Couch.

Myriangium asterinosporum (Ell. & Ev.) Miller was found in abundance on scale insects on living twigs and branches of a single large oneflower hawthorn in Sugarfoot Hammock west of Gainesville.

Myriangium duriaei Mont. & Berk. was found fruiting on scale insects on living twigs and branches of swamp black gum tupelo at Black Lake, near Melrose, and also in Sanchez Hammock, 10 miles northwest of Gainesville.

Myriangium tuberculans Miles was found fruiting on gloomy scale on red maple at Gainesville. This fungus appears to have been reported previously only on Carya spp.

Cephalosporium lecanii Zinn. was found parasitizing hemispherical scale (Saissetia hemispherica (Targ.)) extensively on plants of coontie, Zamia integrifolia Ait., at Cocoa, Brevard County.

Aschersonia cubensis was found parasitizing scale insect on leaves of red bay, Persea borbonia (L.) Spreng., at both Gainesville and Silver Springs (see also under mistletoe).

Sphaerostilbe flammea Tul. was found parasitizing gloomy scale on red maple at Gainesville.

THE "RED RUST" ALGA ON MAGNOLIAS

The red rust caused by the parasitic alga Cephaleuros virescens Kze. was found to be causing considerable leaf spotting and defoliation of large trees of southern magnolia, Magnolia grandiflora L., at Gainesville, Monticello, and Quincy. The disease develops rapidly during the warm humid rainy summers and frequently results in extensive defoliation. A large tree at Monticello that was completely defoliated last summer appeared to be free from the disease when examined in August of this year. In cases where twig infection occurs, however, defoliation would not suffice to control the disease. Red rust is of widespread occurrence throughout a large part of Florida, especially in the extreme southern, more tropical portion of the State, and attacks a large variety of plants (July 25 - August 31).

On sweetbay magnolia, Magnolia virginiana L., it was collected at Lisbon, Lake County (September 26 - October 23).

FURTHER NOTES ON LIGHTNING INJURY TO TREES

A recent instance of lightning stroke as the cause of death of a pond pine, Pinus serotina Michx. was observed in the woods about 6 miles west of Astor Park, Lake Co. A conspicuous furrow, with some shattering of the trunk, occurred on one side of the tree. (November 21 - December 31).

A recently lightning struck longleaf pine, Pinus palustris Mill., with a narrow furrow spiraling down one side, was observed between Ocala and Silver Springs, Marion Co. The stroke had caused the death of this tree also. (November 21 - December 31).

A large isolated laurel oak, Quercus laurifolia Michx. along the roadside at Quincy was observed to be dying rapidly following a recent lightning stroke that tore the usual furrow down the bark.

EMERGENCY PLANT DISEASE PREVENTION PROJECT

GREENHOUSE DISEASES OF ORNAMENTAL PLANTS IN MISSOURI

T. W. Bretz

Greenhouses in the St. Louis area, which request certification by the State Department of Agriculture for out-of-State shipment of their stock, were visited during the week ending February 26 with Mr. J. Allison Denning, the State Entomologist, and members of his staff. All of the plant materials inspected were for ornamental use and the major portion consisted of potted specimens. A wide variety of plants was observed and no attempt is made to indicate their relative importance, either as to quantity produced or value.

Antirrhinum (Snapdragon) - Only one of the ranges visited devoted space to the culture of cut-flowers. The only disease observed, which was of minor importance, was gray mold (Botrytis sp.) causing a branch and stem blight.

Azalea - Leaf spot (tentatively identified as leaf scorch (Septoria azaleae) on the basis of the description in Dodge and Rickett, "Diseases and Pests of Ornamental Plants") was responsible for much disfiguration and defoliation of affected plants.

Begonia - Rootknot (Heterodera marioni) was observed on an occasional plant.

Cineraria - Gray mold (Botrytis sp.) was observed on the lower leaves and the inflorescences of a few specimens.

Coleus - Gray mold (Botrytis sp.) was observed causing a stem rot of cuttings, as well as a foliage blight on potted specimens.

Gardenia - Leaf spot (tentatively identified as the leaf spot described by Dodge and Rickett as due to Rhizoctonia sp.) was generally prevalent, but in no instance was it causing serious damage.

Hedera helix (English Ivy) - A leaf spot determined as probably anthracnose (Colletotrichum trichellum) was observed on a sport of English ivy, called the "ruffle" ivy, in one range. It was causing considerable damage due to disfiguration on this variety only.

Hydrangea - Powdery mildew (Erysiphe polygoni) was prevalent in one house and unless brought under control, appeared to be a potentially destructive disease.

Chlorosis (physiological) was rather common in the majority of houses visited, but not to a serious extent.

Lilium (Easter lily) - In one house, approximately 25% of the plants being forced for the Easter trade showed 2 distinctly abnormal types of development. One of these was characterized by a decided distortion of the growing tips of the stem, resulting from a marked curling and tightly twisted condition of the young leaves. In some of the affected plants there was much abnormal branching. The affected plants in general were

somewhat dwarfed. Examination of these plants revealed no discernible infection nor insect injury.

The other affected plants showed a flat, rosette appearance, some of the leaves being pale green or yellowish, with the younger leaves and terminal buds becoming necrotic. The symptoms were somewhat like those described for the yellow flat or rosette disease (virus) reported on this suscept.

Pelargonium - Oedema (physiological). In one range, 75% of the potted geraniums showed the development of the characteristic tan to rust colored, corky pustules on the under surface of the foliage and along the petioles.

Leaf spot (Botrytis sp.). An occasional plant was observed with a few leaves showing brown, water-soaked lesions, on the surface of which a Botrytis species was fruiting.

Petunia - Mosaic (virus). One lot of potted petunia plants was observed in which fully 50% of the plants showed the typical mottled, malformed foliage and dwarfed condition characteristic of this disease.

Philodendron - Leaf scorch (physiological ?). In all lots of this plant examined, both potted specimens and those in the propagation benches, many leaves were observed with necrotic lesions affecting various sized areas of the leaf blade. In all instances the lesions appeared to begin at the leaf margins and to progress inward in an irregular manner. Microscopic examination of the tissues failed to reveal the presence of any microorganism.

Pothos - Oedema ? (physiological). Most lots of this plant showed some foliage on the surfaces of which there was the development of intumescences, rust-colored and corky in character. No micro-organism could be detected when sections of the affected tissues were examined microscopically and there was no evidence of insect injury.

Sagittaria - A leaf spot due to a fungus identified as Gloeosporium confluens was causing only minor damage to affected specimens.

Saintpaulia - Chlorosis or Ring Spot (physiological). All lots of African violet observed showed the development of some chlorosis. The severity of this disturbance seemed to be associated somewhat with the degree of shading the plants received, being more pronounced in those plants grown under rather intense light conditions.

Gray mold (Botrytis sp.) was commonly observed on this suscept, causing a stem and foliage rot.

Sansevieria - Leaf spot (Fusarium moniliforme ?). A leaf spot, fitting the description given by Dodge and Rickett for lesions due to F. moniliforme, was observed on practically all lots of this ornamental, but it was causing negligible damage. Microscopic mounts failed to show the presence of Fusarium spores, however.

Verbena - Powdery mildew (Erysiphe cichoracearum). In the 2 ranges growing verbena plants, this disease was observed. In one lot the infection was light and not easily detected. In the other, however, the disease was firmly established and was causing considerable damage.

EMERGENCY PLANT DISEASE PREVENTION PROJECT

SUMMARY OF THE MORE IMPORTANT PLANT DISEASES TAKEN IN CONNECTION WITH THE INSECT AND PLANT DISEASE SURVEY IN THE GENERAL VICINITY OF PORTS OF ENTRY FROM JUNE 1943 TO DECEMBER 31, 1943

(Bureau of Entomology and Plant Quarantine)

During the course of this survey there have been submitted 3,615 specimens of plant diseases, of which 555 were eliminated because of their non-pathogenic nature, immaturity of possible pathogens present, host uncertainty, or similar reasons. Of the 3,060 remaining, 600 yet await determination. Of those determined, 1,075 were found on crop plants important in the war effort, and 1,985 were collected on crop relatives, weeds, wild plants, trees, shrubs and ornamentals.

Among the diseases encountered the following appear to deserve mention as of interest to the Plant Disease Survey of the Bureau of Plant Industry, Soils and Agricultural Engineering.

Phomopsis tuberivora of potato, known to occur in British Columbia, was found for the first time in the United States in Whatcom County, Washington.

Marmor cucumeris phaseoli on lima bean from Santa Paula, California.

Marmor leguminosarum on pea from Salinas, California. Dr. H. T. Osborn states that 40 percent of the plants are affected.

According to Dr. L. Shanor, what appears to be a species of Hypodermium was collected on Mahonia nervosa at La Conner, Washington. This genus is not reported on this host.

Septosporium heterosporium on Vitis californica from Chico, California, according to Mr. J. A. Stevenson, has not been collected in years.

Marmor betae on sugar beet from Oxnard, California, was reported by Dr. Osborn as causing medium infection of nearly 100 percent of the plants. He reports another lot of sugar beets in the same locality as 85 percent infected by apparently the same virus.

Apparently Calendula officinalis is a new host for the smut Entyloma compositarum collected at Hoquiam, Washington, according to Dr. Shanor.

Sphaceloma murrayae was collected on willow (Salix sp.) in Skagit County, Washington.

Marmor pisi (pea-enation mosaic) was found on Melilotus indica (?) at Vallejo, California. Dr. Osborn states that to his knowledge, this is the first record of this virus on Melilotus.

What appears to be Lethum australiense var. typicum was collected on lettuce at Salinas, California.

Phyllosticta miurai Miyabe was found on rice growing at Rosenberg, Texas. This pathogen is reported on the same host from Japan and the Philippines.

Briosia ampelophaga collected on wild grape at Westbrook, Connecticut, has been reported from Texas only.

A leaf spot fungus tentatively assigned to the genus Dasypyrena but commonly known as Amerosporium oeconomicum was found on leaves of cowpea from Georgia and South Carolina, on field pea in North Carolina and on

bean (P. vulgaris) from Georgia. As a result the fungus is expected to have a new name soon.

Marmor phaseoli (bean mosaic I) was found on lima bean at Savannah, Georgia.

Didymella sp., Leptothyrium sp. and Periconia sp. were found on Cycas revoluta at Richmond Hill, Georgia. These are not reported on this host in Seymour's list.

Phomopsis sp. found on Cassia chamaecrista var. robusta is not recorded in Seymour. Specimen collected on St. Helena Island, South Carolina.

Gloeosporium sp. and Phyllosticta sp. collected on Lithocarpus comu at Savannah, Georgia, apparently are not recorded on this host.

Mycosphaerella sp. found on Smilax glauca at Waverly, Georgia, appears to be a new species, at least according to Mr. D. P. Limber it is not M. smilacicola Overholts.

A leaf spot fungus causing considerable damage to the foliage of Hydrangea hortensis at Charleston, South Carolina, has been tentatively identified as Colletotrichum sp. Seymour's list does not include any species of this genus on any species of Hydrangea.

Dr. A. W. Blizzard reported a 90 percent infection of the leaves of Kraunhia frutescens by a species of Cercospora at Savannah, Georgia. No record has been found of any species of Cercospora for this host.

A Cercospora collected on Convallaria majalis in South Carolina and on Gaillardia sp. appear to be new as no record has been found of their occurrence on these plants.

According to Mr. Limber a fungus fitting the description of Helminthosporium dematioideum Bubak & Wroblewski was found on corn at Elliot, Maine. This species is not recorded on corn.

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

BRIEF NOTES ON PLANT DISEASES

NEEDLE RUST ON PINE IN MISSISSIPPI AND LOUISIANA: On Pinus palustris needle rust (Coleosporium vernoniae) was found in small amounts near Ellisville, Jones County, Mississippi (March 6 - 11), and was observed to be common on trees on and near the campus of Louisiana State University at Baton Rouge, (February 13 - 19). -- Douglas C. Bain, Emergency Plant Disease Prevention Project.

LEAF SPOT OF CRINUM IN FLORIDA: A leaf spot, tentatively diagnosed as due to Cercospora pancratii, was seen on all plants of Crinum in the Ft. Myers area. -- C. M. Slagg, Emergency Plant Disease Prevention Project. Week ending March 11.

ROSE DISEASES IN TEXAS: Black spot (Actinonema rosae) [Diplocarpon] and Cercospora leaf (Cercospora rosigena) [Mycosphaerella] have been seen occasionally. Neither disease is severe at this time. -- George E. Altstatt, Emergency Plant Disease Prevention Project. March 21.

DISEASES REPORTED ON WEEDS AND MISCELLANEOUS PLANTS IN TEXAS: (See also aster yellows on weeds, page 253). In the Lower Rio Grande Valley, crown rot (Sclerotinia sclerotiorum) was found on Helianthus annuus during

February. This is a new host record for the State. Leaf spot (Septoria helianthi) and rust (Puccinia helianthi-mollis) were also found on this host, in March. Other diseases on miscellaneous plants observed in the Valley include southern blight (Sclerotium rolfsii) on Phacelia sp. in February, and smut (Sphacelotheca sorghi) on Holcus halepensis [Sorghum halepense], leaf spot (Cercospora sp.) on castor bean (Ricinus communis), and rust (Puccinia paspalicola) on Solanum eleagnifolium, in March. -- Stuart M. Pady, Emergency Plant Disease Prevention Project.

In the Coastal Bend area, during the latter part of February, leaf rust, probably Puccinia sorghi, was prevalent on wild wood sorrel (Oxalis sp.) and white rust, probably Albugo tragopogonis, was seen on thistle (Cirsium sp.) in several instances.

In March, white rust (Albugo candida) was observed on numerous plants of peppergrass (Lepidium sp.) in various parts of Nueces County. On star thistle (Centaurea solslitialis) a white rust (Albugo sp.) was abundant in one locality in Nueces County (near Bishop) and was observed in a few instances in San Patricio County. Sclerotinia sclerotiorum has been found infecting roots and basal portions of the stems of star thistles. -- George E. Altstatt, Emergency Plant Disease Prevention Project.

In East Texas, Peronospora geranii was found on the common weed, Geranium texanum, at various places in Cherokee County. Wild dewberry (Rubus trivialis) was seen at New Summerfield beginning to send out etiolated shoots bearing pycnia of the rust Gymnoconia interstitialis [G. peckiana]. -- G. M. Watkins, Emergency Plant Disease Prevention Project. February 21 - 25.

SOME CORRECTIONS: On page 84 of Supplement 145, recently issued, Connecticut is listed as No. 55. The number should be 5.

On page 170 of the February 15 - March 1 issue, the title for Map 2 should read Percentage of normal precipitation by States, January 1944.

THE WINTER OF 1943 - 44

(From U. S. Department of Commerce, Weather Bureau, Weekly Weather and Crop Bulletin for week ending March 7, 1944).

Map 1 shows the departures of mean temperature from normal for the winter (December - February) 1943 - 44. In the Northeast they were zero or slightly minus and were 1° to 3° above normal in the Atlantic States and the Cotton Belt. However, a large north-central area had an outstandingly warm winter, with plus anomalies ranging from 6° to as many as 12°. West of the Rocky Mountains the winter means varied from 4° below normal in the eastern Great Basin and some adjoining Rocky Mountain sections to 2° or 3° above normal in other areas.

Recent Winter Temperatures. -- In conformity with the general tendency for the last quarter of century, the 1943 - 44 winter for the country as

a whole was warmer than normal. This general trend to abnormal warmth is shown on Figure 1 which indicates, year by year, departures from normal temperature for the last half century. An examination of the chart discloses that 11 of the first 25 winters had above-normal temperature and 14 below normal, while for the last 25, 18 were above and only 7 below. The winter of 1943-44, in general, conformed to its immediate predecessors.

The chart shows also that there has been a tendency for relatively cold and warm winters to fall into groups of two or more in succession, more pronouncedly so in the case of the plus anomalies. The longest period of consecutively cold winters was four and of warm six. During this half century the most outstanding period of warm winters was that of 1920-21 to 1934-35, with only two of the 15 colder than normal. Six of last seven winters have had above-normal temperature, on a nation-wide basis, with the lone exception averaging only 0.1° deficient.

Winter Precipitation. -- Map 2 shows the percentage of normal precipitation for the period December 1943 - February 1944, based on first-order stations. The winter was wetter than normal in the Cotton Belt, except the extreme South, and also in the far Southwest and over a wide belt extending from the Rio Grande Valley northward to South Dakota. Otherwise, it was drier than normal, with large deficiences in central-northern districts and from the upper Ohio Valley and western Lake region eastward. In the Pacific coast area, central and southern California were abnormally wet, while precipitation was far below normal in northern sections.

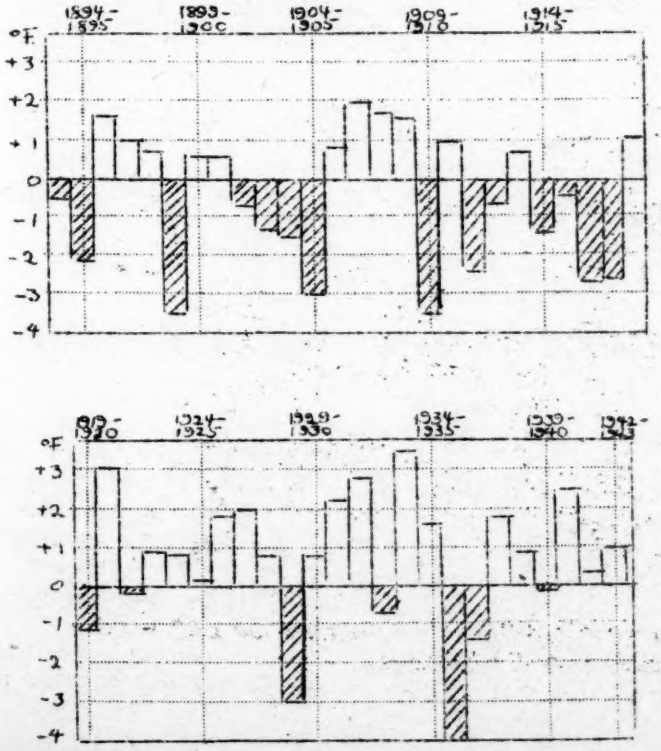
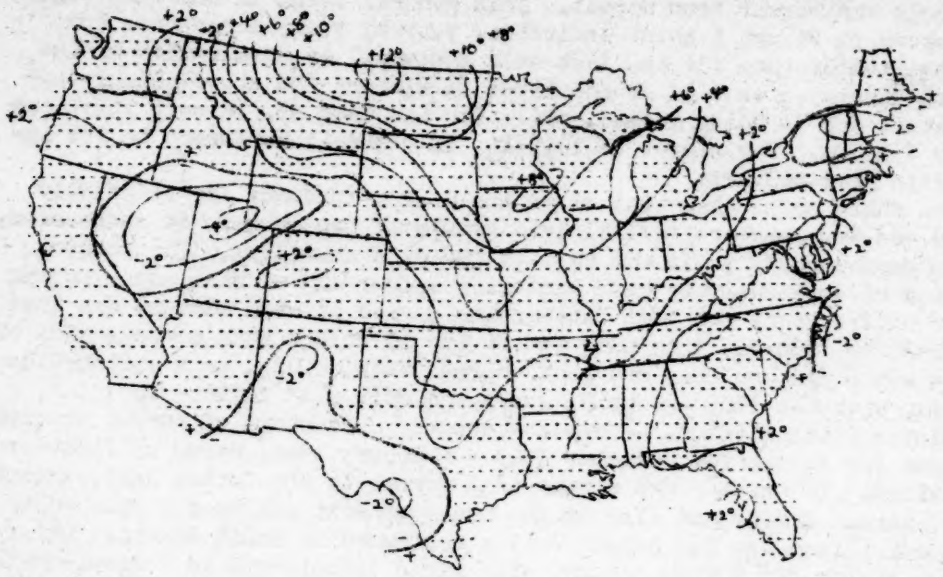
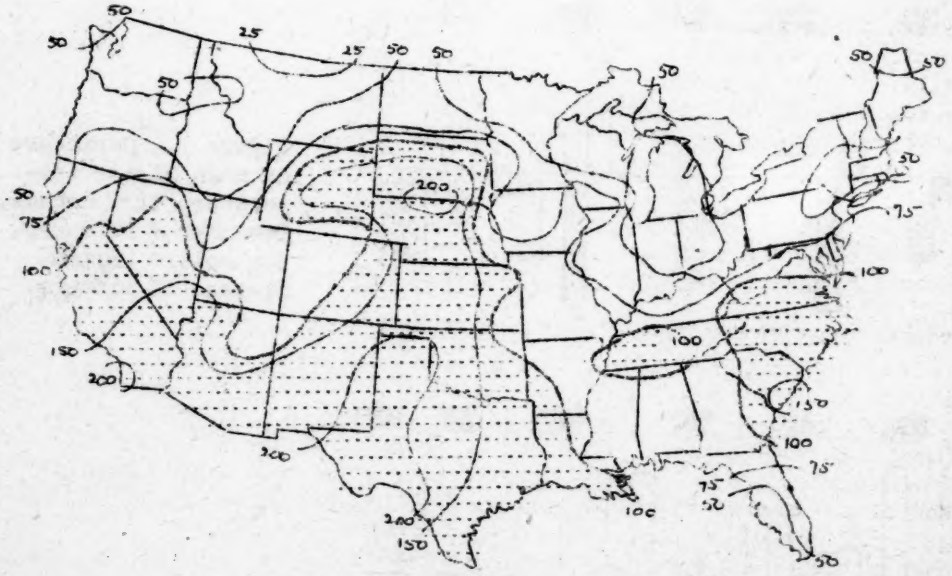


Figure 1. Departure of mean winter temperature from normal, December - February, for entire United States, 50 winters.



Map 1. Departure of mean temperature from the normal, winter of 1943 - 44 (December - February).



Map 2. Percentage of normal precipitation, winter of 1943 - 44 (December - February).